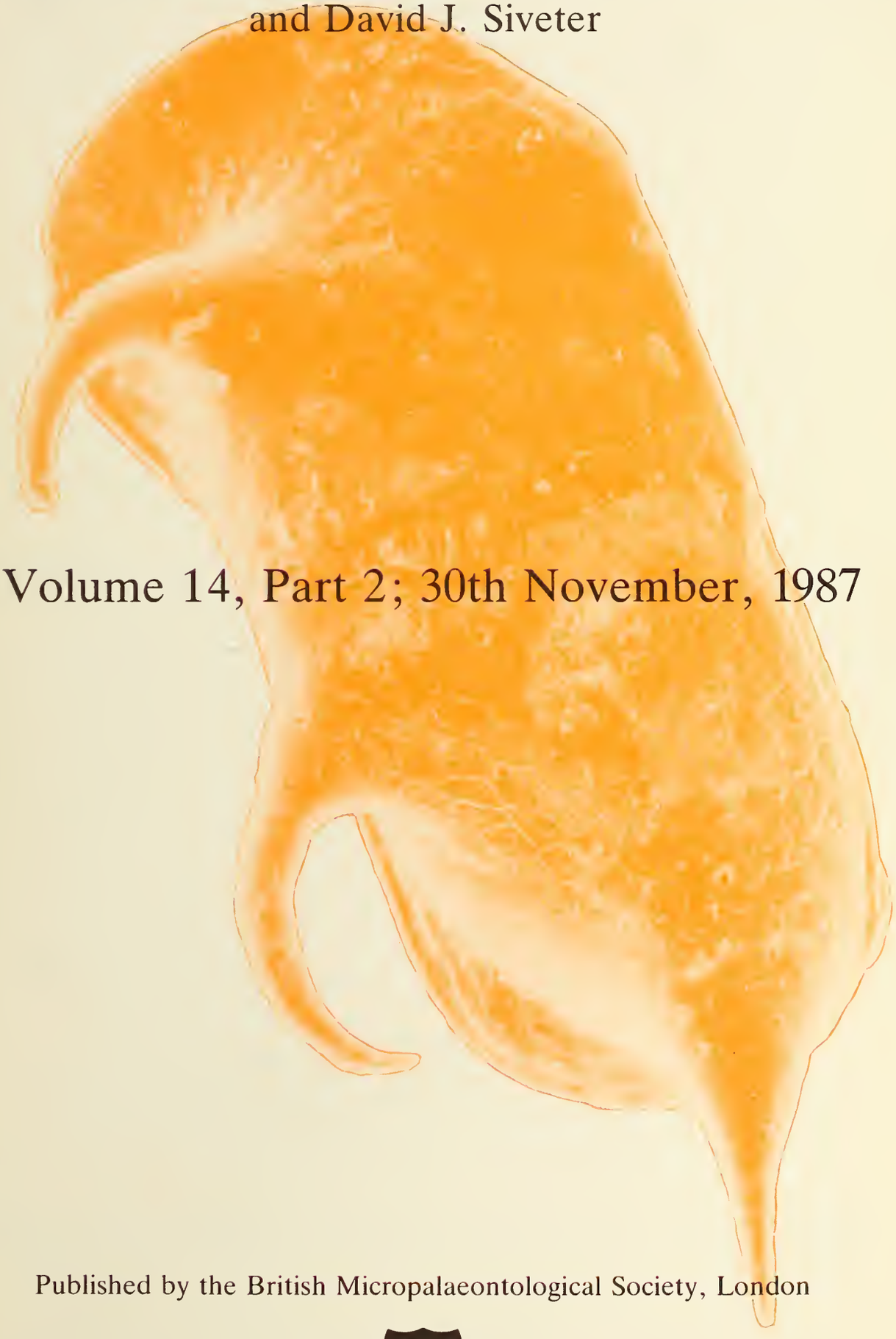
A Stereo-Atlas of Ostracod Shells

edited by R. H. Bate, D. J. Horne, J. W. Neale,
and David J. Siveter



Volume 14, Part 2; 30th November, 1987

Published by the British Micropalaeontological Society, London

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Instructions to Authors

Contributions illustrated by scanning electron micrographs of Ostracoda in stereo-pairs are invited. Format should follow the style set by the majority of papers in this issue. Descriptive matter apart from illustrations should be cut to a minimum; preferably each plate should be accompanied by one page of text only. Blanks to aid in mounting figures for plates may be obtained from any one of the Editors or Editorial Board. Completed papers should be sent to Dr David J. Siveter.

Financial support from The British Petroleum Company p.l.c. for the publication of this issue is gratefully acknowledged.

The front cover shows a left valve of *Neolimnocythere hexaceros* Delachaux, 1928, from Quaternary Deposits at Lago Junin, Peru. Photograph by Dr P. De Deckker, University of Monash, Victoria, Australia.

Printed in the UK by BPCC Northern Printers Ltd., Stanley Road, Blackpool FY1 4QN

A Stereo-Atlas of Ostracod Shells

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Volume 14, 1987

Part 1 (pp.1–72); 30th May, 1987
Part 2 (pp. 73–151); 30th November, 1987

Published by the British Micropalaeontological Society, London

Contents

ON *KUIPERIANA ROBUSTA* WHATLEY & MAYBURY sp. nov.

by Robin Whatley & Caroline Maybury
(University College of Wales, Aberystwyth)

Kuiperiana robusta sp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12976,** ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12977, OS 12978**].

Type locality: Blue Clay, sample no. 29, NW corner of Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, from the robust nature of the valves.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12976** (holotype, ♀ LV: Pl. **14,** 74, fig. 1; Pl. **14,** 76, fig. 2), **OS 12977** (paratype, ♀ RV: Pl **14,** 74, fig. 2; Pl. **14,** 76, figs. 1, 3, 4), **OS 12978** (paratype, ♂ LV: Pl. **14**, 74, fig. 3). All from the type locality and horizon.

Explanation of Plate 14, 74

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12976,** 550μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12977,** 560μm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12978,** 550μm long).
Scale A (100μm; × 104), figs. 1–3.

Diagnosis: Medium-sized, strongly dimorphic with circular to subcircular, regularly disposed punctae medianly and reticulae peripherally. Dorsomedianly with 3 short, inclined sulcate depressions. Posterior marginal rim narrow and alar process bluntly rounded. Eye tubercle inconspicuous. Inner lamella moderately wide, undulose posteroventrally with a wide ventral flange and selvage and list developed. Hinge gongylodont with a long, thin, smooth groove/bar medianly; the posterior terminal element of the right valve is a curved tooth with a frill-like dorsal surface.

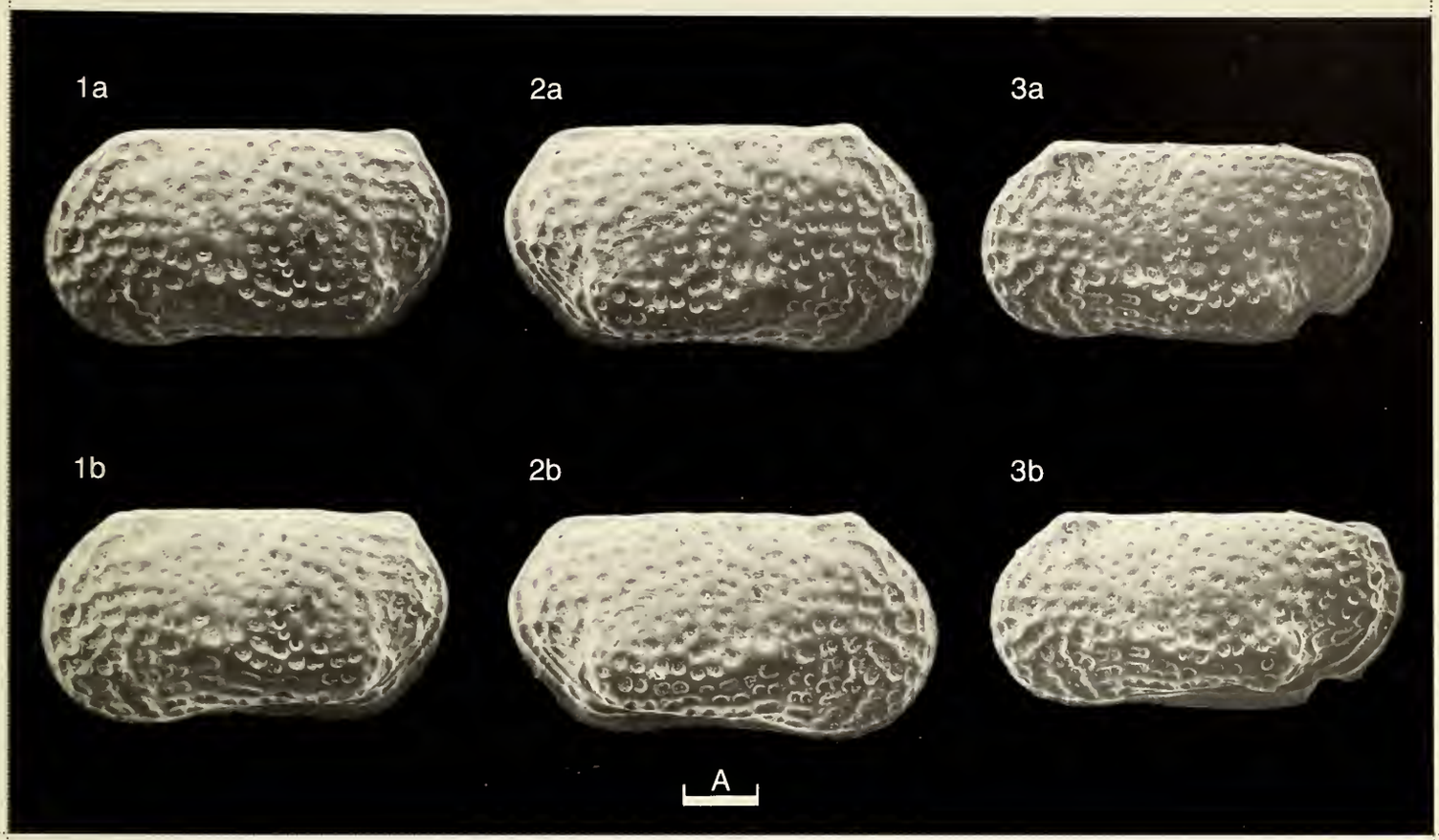
Remarks: This species differs from the type-species, *K. wanneri wanneri* (Kuiper, 1918) (W. N. Kuiper, *Oligocäne und Miocäne Ostracoden aus den Niederlanden,* publ. PhD thesis, Groningen, 26–27, pl. 1, figs. 8a–c, 1918 and M.A.A. Bassiouni, *Roemeriana,* **3,** 62–66, pl. 8, figs. 1–3, 1962) in that its reticulae are less regularly ordered ventrally, its eye tubercle is difficult to distinguish from ornament (whereas it is well defined in *K. wanneri wanneri*) and it possesses an alar process. (*K. wanneri wanneri* is inflated ventrally, but lacks a clearly defined alar protuberance). Both species possess punctate and reticulate ornament and have elongate, subrectangular lateral outlines.

The ratio of adult to juvenile specimens of *K. robusta* in the authors' material is low (1:43), with only 5 adult specimens recovered.

Distribution: Upper Pliocene deposits of St. Erth, England (sample nos. 1–4, 7, 11, 16, 18, 22–23, 25–29) and Upper Pliocene (Redonian) deposits of Apigné (Borehole II, Le Temple du Cerisier), Le Bosq d'Aubigny and Saint-Jean-la-Poterie (sample no. 1549.15); NW France. See C. Maybury (*Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France,* unpubl. PhD thesis, Univ. Wales, **1,** 3–29, 1985) and J. –P. Margerel (*Les Foraminifères du Redonien. Systématique, Répartition stratigraphique, Paléoécologie,* Nantes, **1,** 8–26, 1968) for geographical, stratigraphical and sample details.

Explanation of Plate 14, 76

Figs. 1, 3, 4, ♀ RV (paratype, **OS 12977,** 560μm long): fig. 1, int. lat.; fig. 3, ant. hinge element; fig. 4, post. hinge element; fig. 2, ♀ LV, int. lat. (holotype, **OS 12976,** 550μm long).
Scale A (100μm; × 104), figs. 1, 2; scale B (40μm; × 330), figs. 3, 4.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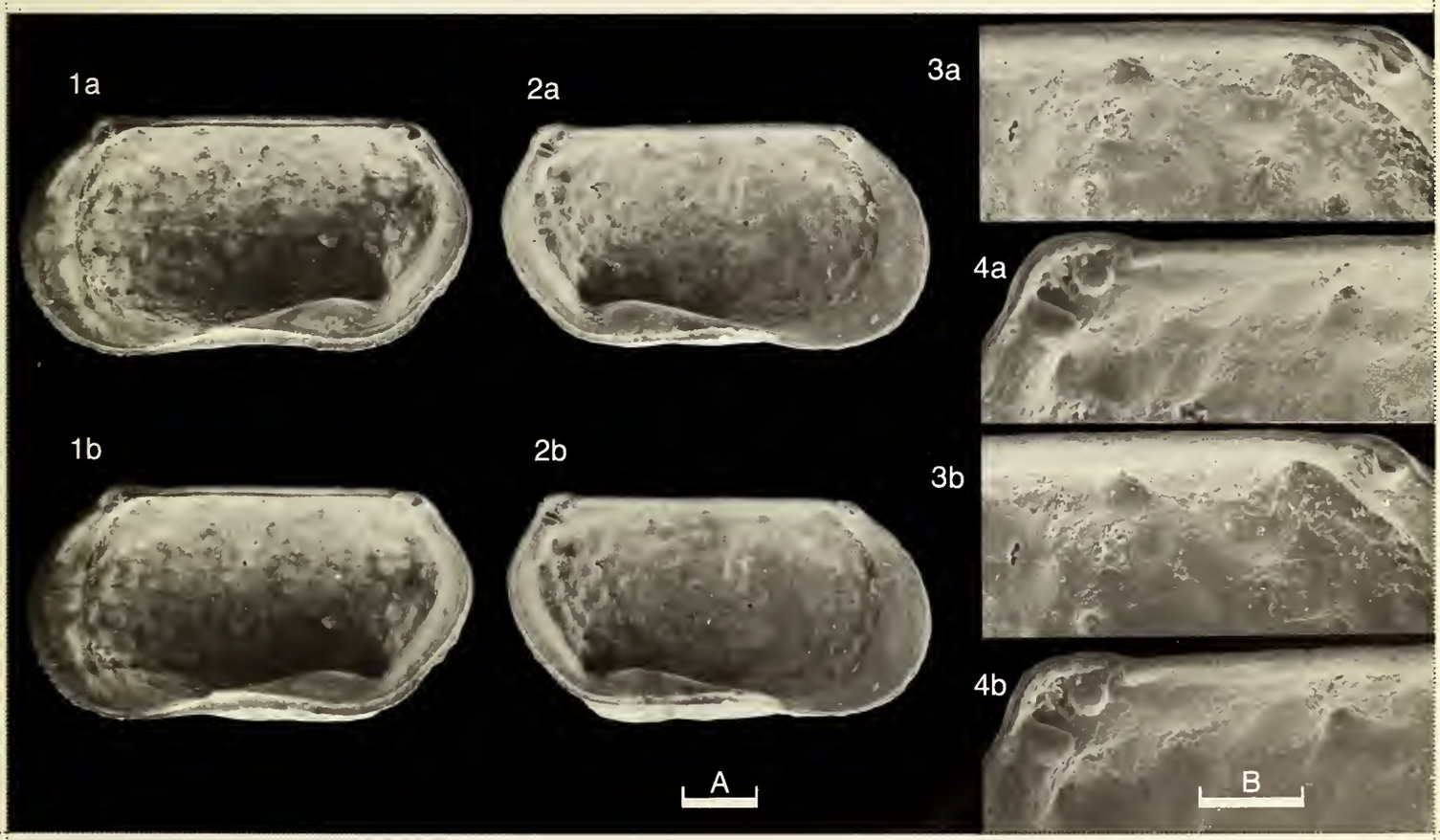
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595.337.14 (118.22) (420:162.006.50) : 551.351+552.52

ON *LOXOCAUDA SUBQUADRATA* MAYBURY & WHATLEY sp. nov.

by Caroline Maybury & Robin Whatley
(University College of Wales, Aberystwyth)

Loxocauda subquadrata sp. nov.

Holotype: British Museum (Nat. Hist.) no **OS 12906**, ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12907–OS 12909**].

Type locality: Blue Clay, sample no. 16, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, from the outline of the valves in lateral view.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12906** (holotype, ♀ LV: Pl. **14**, 78, fig. 1), **OS 12907** (paratype, ♀ RV: Pl. **14**, 78, fig. 2), **OS 12908** (paratype, ♂ LV: Pl. **14**, 78, fig. 3; Pl. **14**, 80, figs. 2–4), **OS 12909** (paratype, ♂ RV: Pl. **14**, 80, fig. 1). All from the type locality: specimen **OS 12907** is from Mottled Clean Clay (sample no. 2); specimen **OS 12908** is from a mixed sample (no. 7) and specimen **OS 12909** is from the same sample as the holotype. See C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France*, unpub. PhD thesis, Univ. Wales, **1**, 3–6, 1985 for sample details.

Explanation of Plate 14, 78

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12906**, 380 μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12907**, 390 μm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12908**, 430 μm long).
Scale A (100 μm; ×160), figs. 1–3.

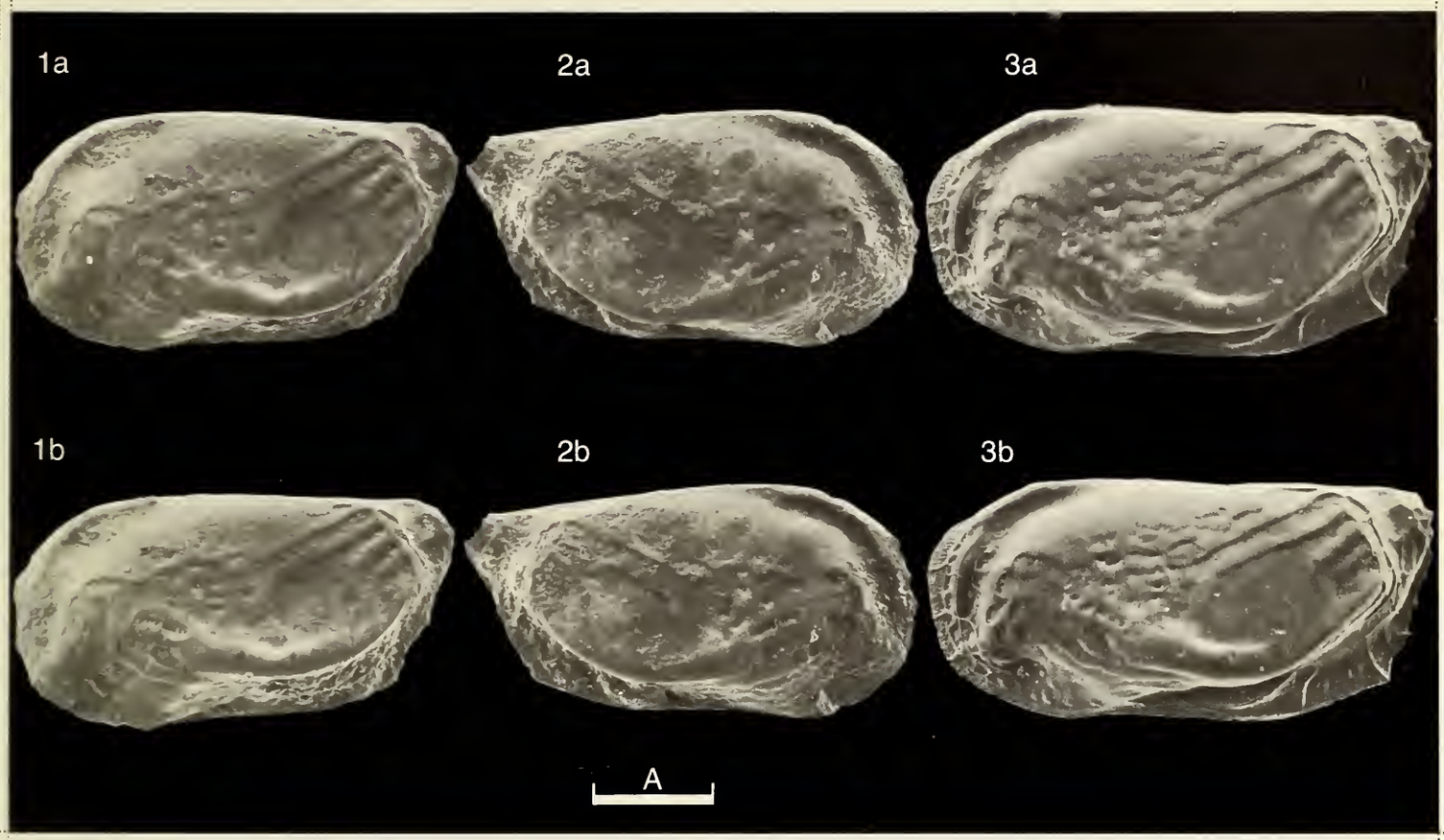
Diagnosis: A very small to small, subquadrate species of *Loxocauda* characterised by a lateral surface with 4 obliquely disposed ridges posterodorsally and traces of a reticulum anteromedianly and anteroventrally; remainder smooth. Free marginal areas strongly compressed with a prominent, curved, sub-alar process posteriorly and posteroventrally. Hinge unusual: comprising in the left valve, a smooth bar with its anterior and posterior ends enclosed by narrow, horizontal, "u"-shaped sockets themselves bounded by "u"-shaped ridges. Muscle scars comprising four contiguous adductors, a "v"-shaped frontal and two subcircular mandibular scars.

Remarks: The genus *Loxocauda* is known only from three previously described species: the type-species, *L. muelleri* Schornikov, 1969 (*in*: F. D. Mordukhai-Boltovskoi, (Ed.) *Identification Key to the Fauna of the Black and Azov Seas, 2*, 201, pl. 28, fig. 1, Kiev, 1969), *L. fragilis* (Sars, 1866) (G. O. Sars, *Forh. Vidensk Selsk. Krist.*, **1865**, 65–66, 1866 and *An account of the Crustacea of Norway*, **9**, *Ostracoda*, pts. 13, 14, 222, pl. 102, fig. 3, 1926) and *L. decipiens* (G. W. Müller, 1894) (G. W. Müller, *Fauna Flora Golf. Neapel*, **21**, 347–348, pl. 27, figs. 10–14, 24, pl. 29, figs. 2, 9, 1894). All these species differ from the new species in that they lack the traces of a reticulum and the sub-alar process which are characteristic of *L. subquadrata*. The present species (and all known *Loxocauda* species) resemble *Pseudocythere* Sars in shape and outline. The two genera differ, however, in their musculature, hingement and appendages.

Distribution: The species is known only from the Upper Pliocene deposits of St. Erth, Cornwall, England (samples nos. 1–4, 7, 16, 21, 23, 25–28, C. Maybury, *op. cit.*).

Explanation of Plate 14, 80

Fig. 1, ♂ RV, ext. lat. (paratype, **OS 12909**, 400 μm long); figs. 2–4, ♂ LV, (paratype, **OS 12908**, 430 μm long): fig. 2, int. lat.; fig. 3, ant. hinge element; fig. 4, post. hinge element.
Scale A (100 μm; ×160), figs. 1, 2; scale B (40 μm; ×400), figs. 3, 4.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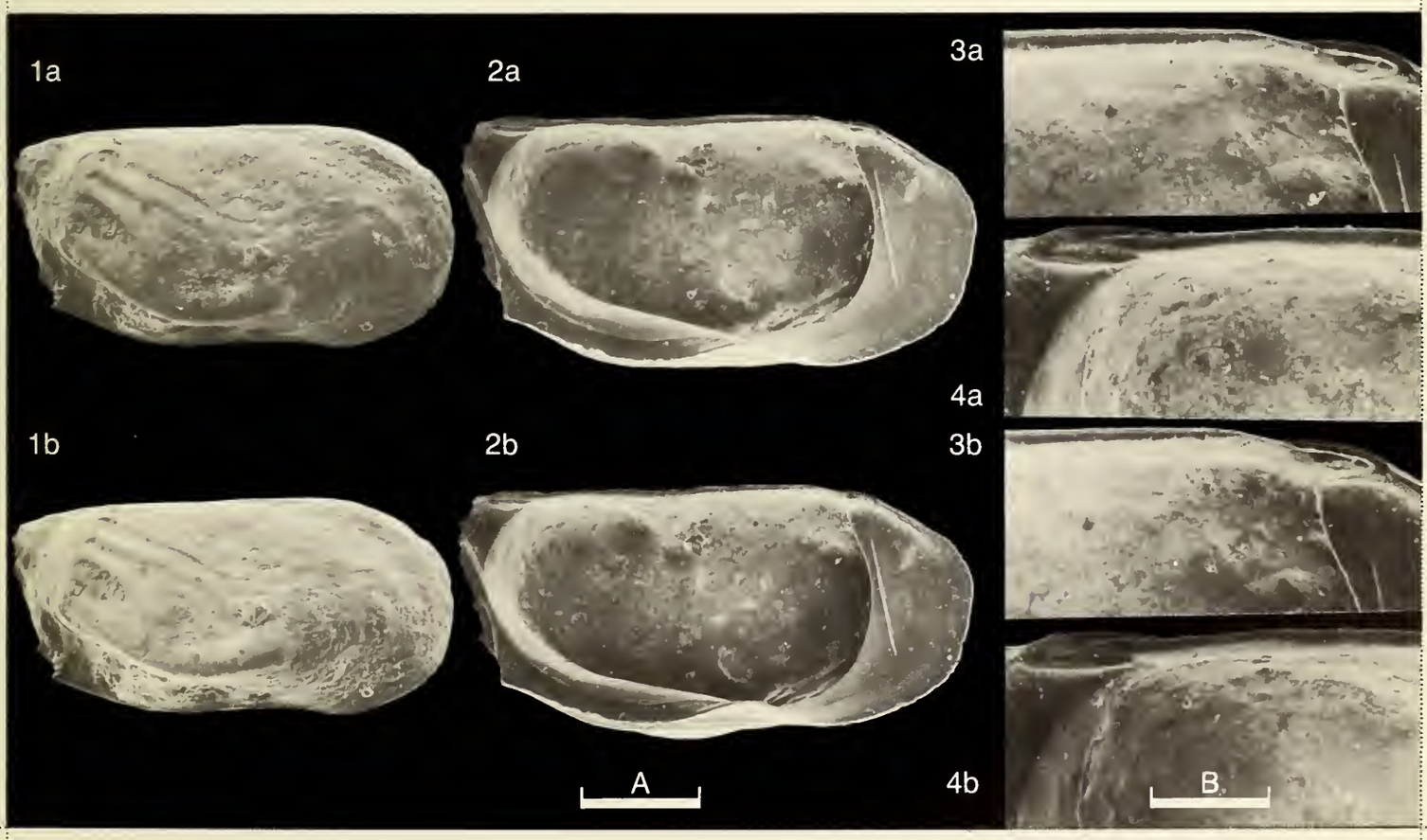
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595.337.14 (118.22) (420 : 162.006.50) : 551.351 + 552.52

ON *SAGMATOCYTHERE MINUTA* MAYBURY & WHATLEY sp. nov.

by Caroline Maybury & Robin Whatley
(University College of Wales, Aberystwyth)

Sagmatocythere minuta sp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12849,** ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12850 – OS 12853**].

Type locality: Mixed sample, sample no. 7, Vicarage Pit. St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, referring to the very small size of the species.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12849** (holotype, ♀ LV: Pl. **14,** 82, fig. 1), **OS 12850** (paratype, ♀ RV: Pl. **14,** 82, fig. 2), **OS 12852** (paratype, ♂ RV: Pl. **14,** 82, fig. 3), **OS 12851** (paratype, ♂ LV: Pl. **14,** 84, fig. 1), **OS 12853** (paratype, ♀ RV: Pl. **14,** 84, fig. 2), **OS 12854** (paratype, ♂ LV: Pl. **14,** 84, fig. 3). Specimens **OS 12850** and **OS 128854** from the same sample as the holotype; the remaining paratypes from Brown Clay (sample no. 28) at the type locality. See C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France,* unpub. PhD thesis, Univ. Wales, **1,** 3–6, 1985 for sample details.

Explanation of Plate 14, 82

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12849,** 370μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12850,** 370μm long); fig. 3, ♂ RV, ext. lat. (paratype, **OS 12852,** 380μm long).
Scale A (100μm; × 161), figs. 1–3.

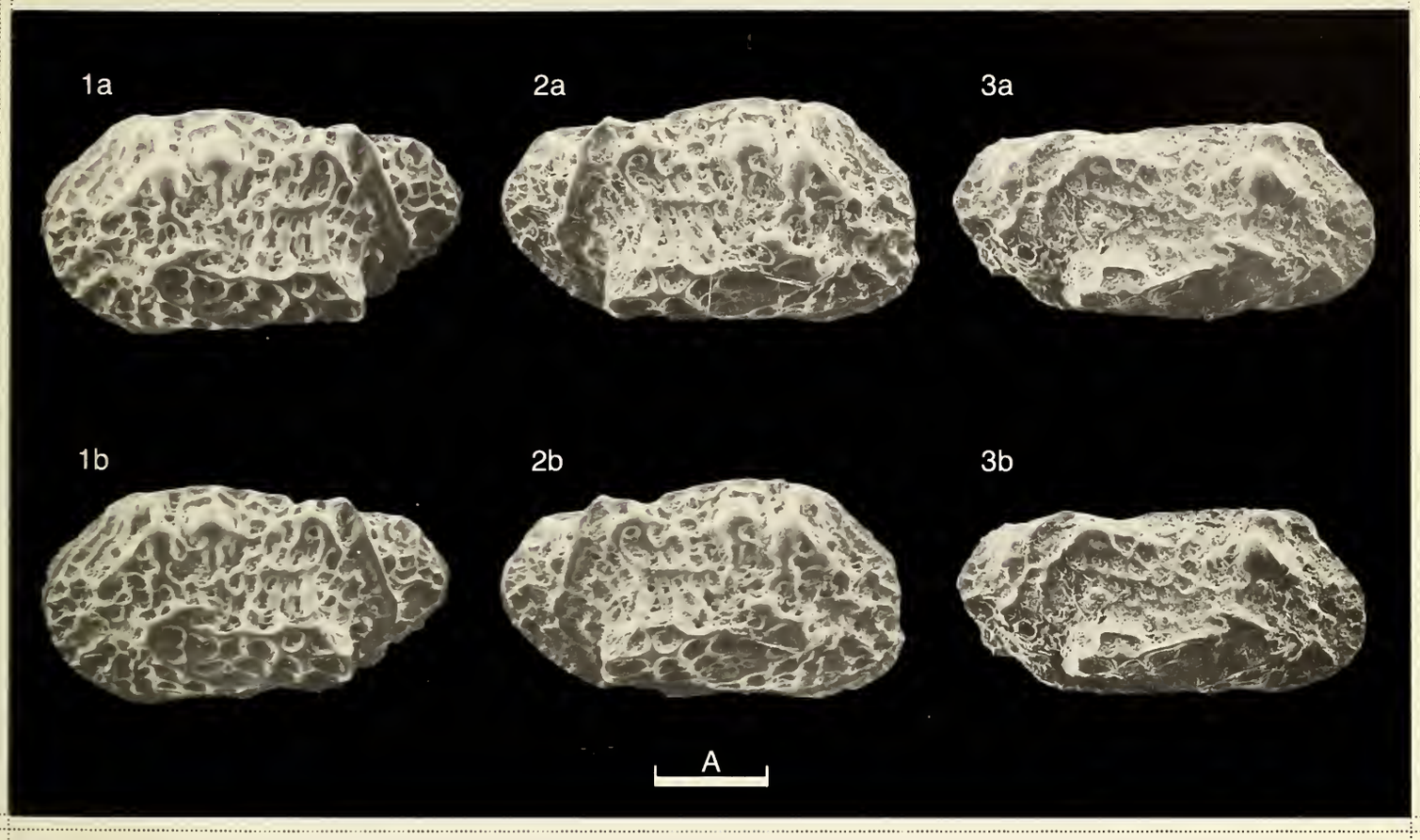
Diagnosis: A very small, strongly dimorphic, alate species of *Sagmatocythere* with a complex ornament of nodes and reticulae. In females there are two anterodorsal nodes, in males only one; their position is reflected internally by shallow circular to subcircular depressions. The anterior of the two anterodorsal nodes in the female and the anterodorsal node of the male is situated below the eye tubercle and is connected to it by a smooth rib. Posterodorsal node well defined and bearing a prominent, inverted u-shaped dorsal loop. Selvage well developed and blade-like mid-ventrally.

Remarks: This species, *Sagmatocythere alaefortis alaefortis* Whatley & Maybury (*Stereo-Atlas Ostracod Shells,* **14,** 85–88, 1987) and *S. alaefortis gallica* Whatley & Maybury (*Stereo-Atlas Ostracod Shells,* **14,** 89–92, 1987) form a distinct group of *Sagmatocythere* whose noded and irregularly reticulate ornament distinguishes them from the "*napoliana*" and "*multifora*" groups. The "*napoliana*" group comprises *S. napoliana* (Puri, 1963) (see J. Athersuch, *Stereo-Atlas Ostracod Shells,* **3,** 117–124, 1976), *S. cristatissima* (Ruggieri, 1967) (*Riv. ital. Paleont. Stratigr.,* **73,** 374–376, figs. 37–38) and *S. wyatti* Maybury & Whatley, 1987 (*Stereo-Atlas Ostracod Shells,* **14,** 93–96). These strongly reticulate species all possess muri which are narrow and almost "blade-like". The "*multifora*" group comprises *S. multifora* (Norman, 1865) (*In:* G. S. Brady, *Nat. Hist. Trans. Northumberland and Durham,* **1,** 18–19, pl. 6, figs. 13–16), *S. littoralis* (G. W. Müller, 1894) (*Fauna Flora Golf. Neapel* **21,** 346, pl. 27, fig. 9, pl. 29, figs. 1, 7), *S. paracercinata* Whatley & Maybury, 1984 (*Stereo-Atlas Ostracod Shells,* **11,** 21–24) and *S. pseudomultifora* Maybury & Whatley, 1984 (*Stereo-Atlas Ostracod Shells,* **11,** 25–28). Species of this group are alate and possess regular reticulate ornament. The small size of the adults of *S. minuta* make it the smallest *Sagmatocythere* yet recorded.

Distribution: The species has been recovered from the Upper Pliocene deposits of St. Erth, Cornwall, England (sample nos 1–4, 7, 16, 18, 23, 25–28) and the Upper Pliocene (Redonian) deposits of Apigné (Le Temple du Cerisier), NW France. (See C. Maybury, *op. cit.,* for sample details).

Explanation of Plate 14, 84

Fig. 1, ♂ LV, ext. lat. (paratype, **OS 12851,** 380μm long); fig. 2, ♀ RV, int. lat. (paratype, **OS 12853,** 370μm long); fig. 3, ♂ LV, int. lat. (paratype, **OS 12854,** 380μm long).
Scale A (100μm; × 161), figs. 1–3.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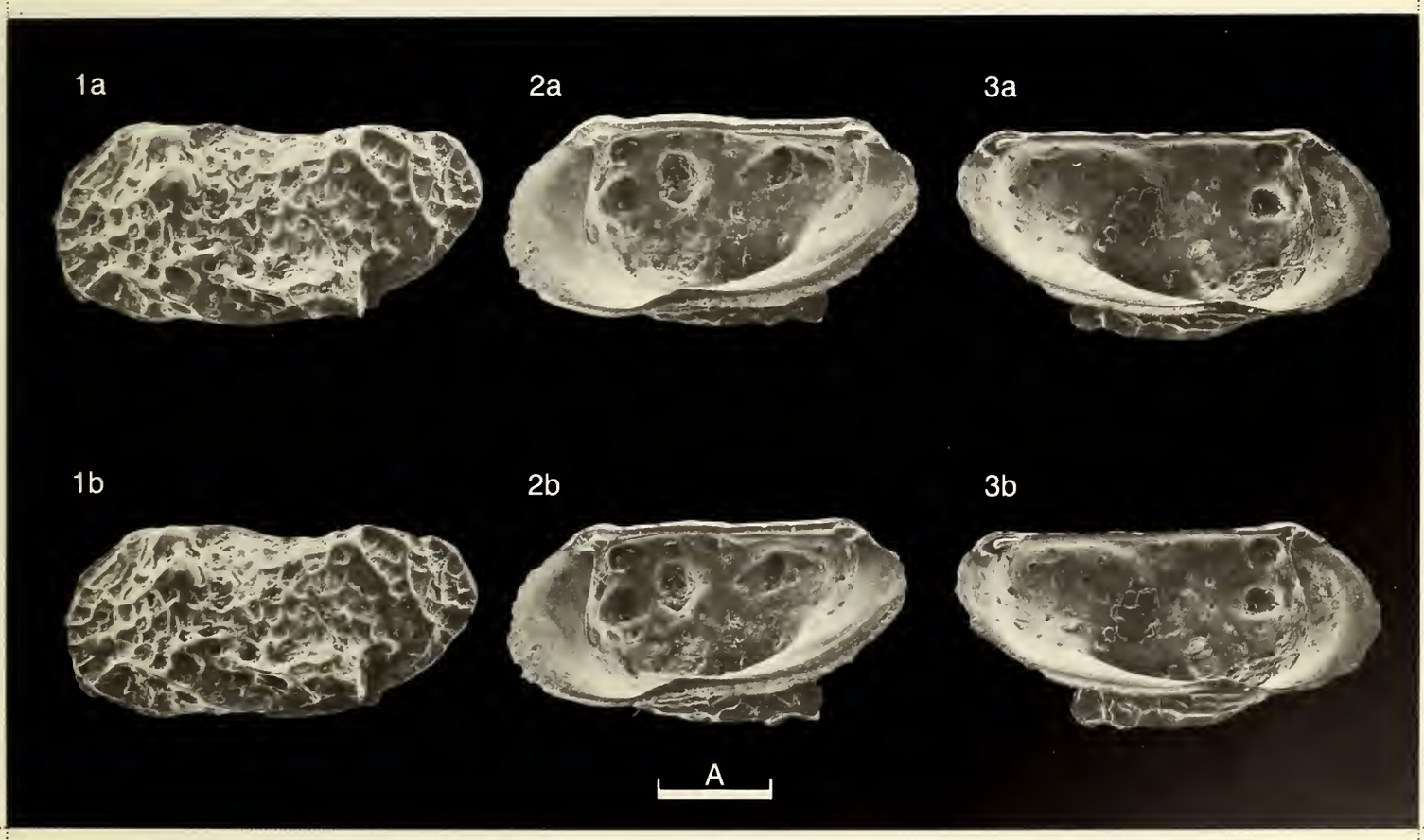
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595.337.14 (118.22) (420 : 162.006.50) : 551.351 + 552.52

ON *SAGMATOCYTHERE ALAEFORTIS ALAEFORTIS* WHATLEY & MAYBURY sp. & subsp. nov.

by Robin Whatley & Caroline Maybury
(University College of Wales, Aberystwyth)

Sagmatocythere alaefortis alaeforti sp. & subsp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12843**, ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12844–OS 12848**].

Type locality: Brown Clay, sample no. 28, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, from the strongly developed alae of this species.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12843** (holotype, ♀ LV: Pl. **14**, 86, fig. 1), **OS 12844** (paratype, ♀ RV: Pl. **14**, 86, fig. 2), **OS 12845** (paratype, ♂ LV: Pl. **14**, 86, fig. 3), **OS 12846** (paratype, ♂ RV: Pl. **14**, 88, fig. 1), **OS 12847** (paratype, ♀ RV: Pl. **14**, 88, fig. 2), **OS 12848** (paratype, ♂ LV: Pl. **14**, 88, fig. 3). Specimens **OS 12845**, **OS 12846** and **OS 12848** are from the same sample as the holotype. Specimen **OS 12844** is from a bulk sample (sample no. 1) and specimen **OS 12847** from a mixed sample; both are from the type locality and horizon. See C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France*, unpub. PhD thesis, Univ. Wales, **1**, 3–6, 1985 for sample details.

Explanation of Plate 14, 86

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12843**, 450 μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12844**, 460 μm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12845**, 500 μm long).
Scale A (100 μm; ×125), figs. 1–3.

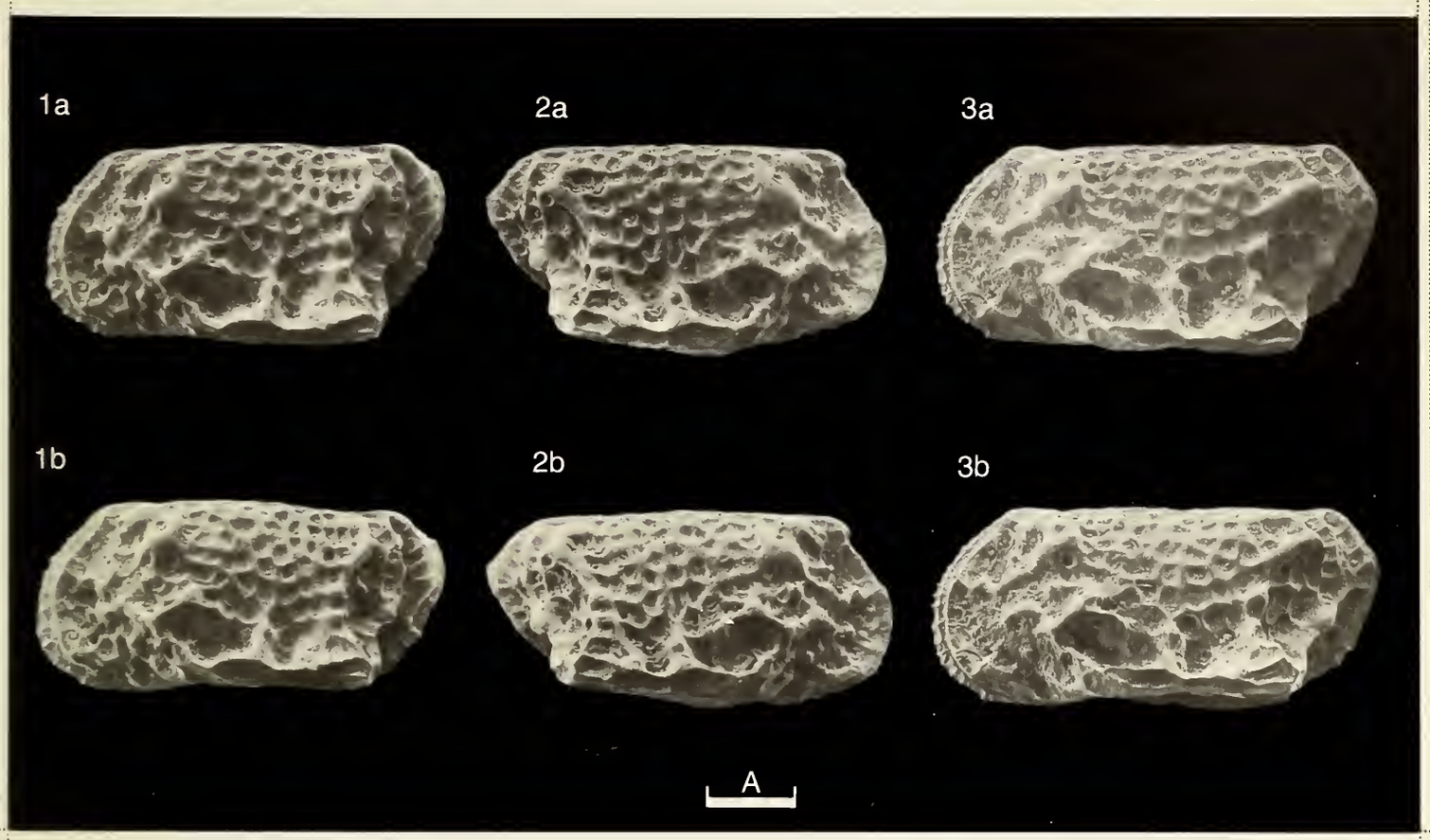
Diagnosis: A medium, subrectangular subspecies of *Sagmatocythere* with a straight dorsal margin and strongly developed alae. Anterior and posterior marginal areas flattened and with ornament less well developed. Reticulate mid-dorsally and dorsomedianly. Ribs massive and angular in the alar region of the valve with two deep depressions midventrally. Eye tubercle irregular in outline and connected with a subrounded, anterodorsal node. Thickened ribs in the posterodorsal area of the female and male left valve assume a more noded character in the male right valve.

Remarks: The posterodorsal protuberance/node and irregularly reticulate ornament of this species is similar to that of certain species of *Loxocorniculum* Benson & Coleman, 1963 (*Paleont. Contr. Univ. Kansas.*, no. 31, 38) such as the type-species, *L. fischeri* (Brady, 1869) (*In*: L. De Folin & L. Périer (eds.), *Les Fonds de la Mer*, **1**(1), 154, pl. 18, figs. 15–16, 1869). The present authors, however, differentiate the two genera on the basis of their hinge structure: species of *Sagmatocythere* possessing a gongylodont hinge with a smooth median element and species of *Loxocorniculum* a gongylodont hinge with a strongly denticulate median element.

Distribution: Upper Pliocene deposits of St. Erth, Cornwall, England (sample nos. 1–4, 7, 11, 21, 23, 25–29; see C. Maybury, *op. cit.*, **1**, 3–6 for sample details).

Explanation of Plate 14, 88

Fig. 1, ♂ RV, ext. lat. (paratype, **OS 12846**, 500 μm long); fig. 2, ♀ RV, int. lat. (paratype, **OS 12847**, 450 μm long); fig. 3, ♂ LV, musc. sc. (paratype, **OS 12848**, 500 μm long).
Scale A (100 μm; ×125), figs. 1, 2; scale B (10 μm; ×700), fig. 3.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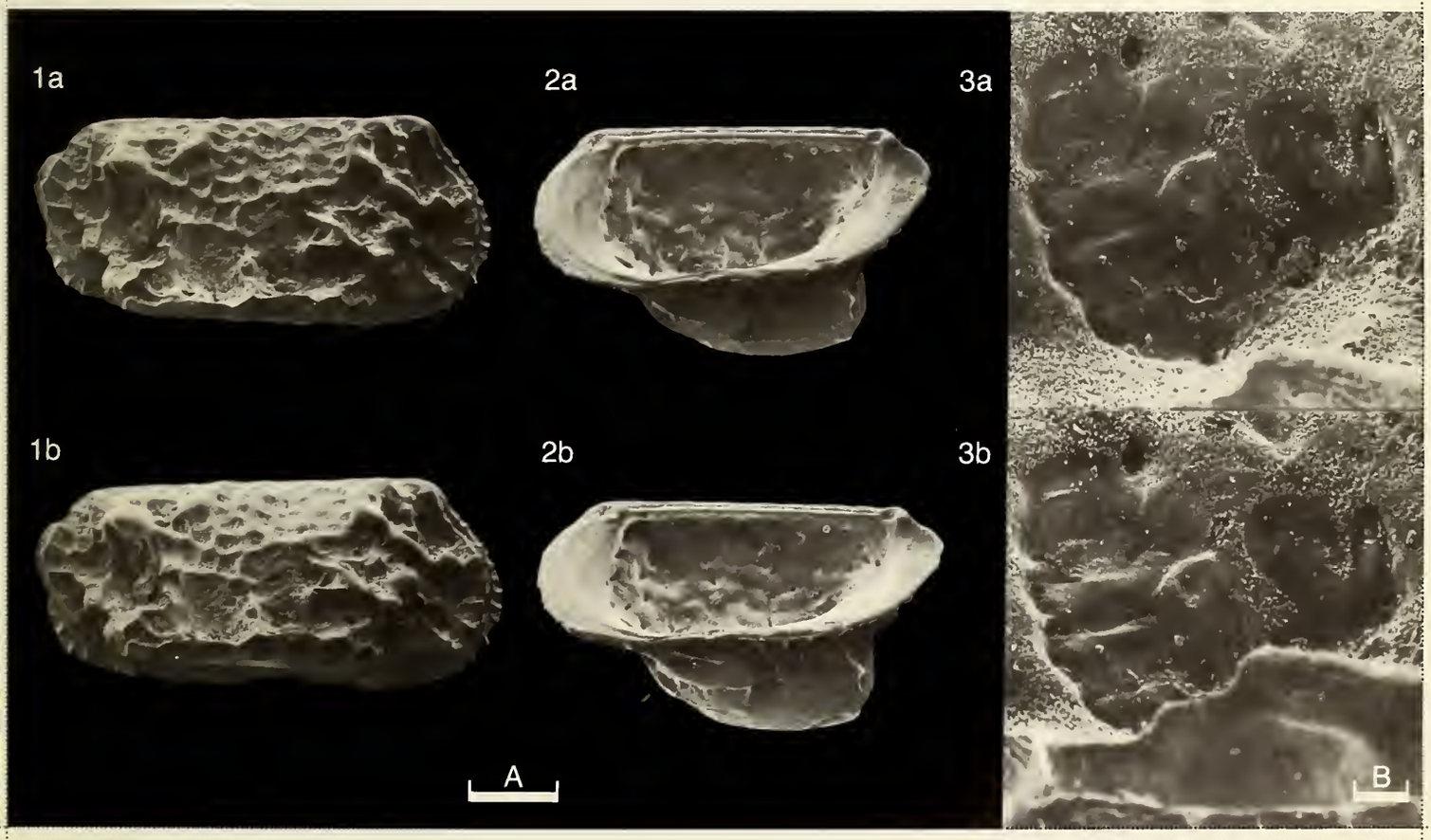
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595.337.14 (118.22) (40 : 162.002.48) : 551.351 + 552.51

ON *SAGMATOCYTHERE ALAEFORTIS GALLICA* WHATLEY & MAYBURY subsp. nov.

by Robin Whatley & Caroline Maybury
(University College of Wales, Aberystwyth)

Sagmatocythere alaefortis gallica subsp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12839,** ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12840 – OS 12842**].

Type locality: Shell-rich sand, Le Temple du Cerisier, SW of Rennes (approx. lat. 48° 07′N, long. 1° 41′W), NW France; Upper Pliocene, Redonian.

Derivation of name: Latin, referring to the fact that the subspecies has only been found in the Redonian deposits of France.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12839** (holotype, ♀ LV: Pl. **14,** 90, fig. 1), **OS 12840** (paratype, ♀ RV: Pl. **14,** 90, fig. 2), **OS 12841** (paratype, ♂ LV: Pl. **14**, 90, fig. 3), **OS 12842** (paratype, ♂ RV: Pl. **14,** 92, figs. 1–4). All from the type locality and horizon.

Explanation of Plate 14, 90

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12839,** 430μm long); fig. 2, ♀ RV, ext. lat. (paratype, **OS 12840,** 440μm long); fig. 3, ♂ LV, ext. lat. (paratype, **OS 12841,** 480μm long).
Scale A (100μm; × 135), figs. 1–3.

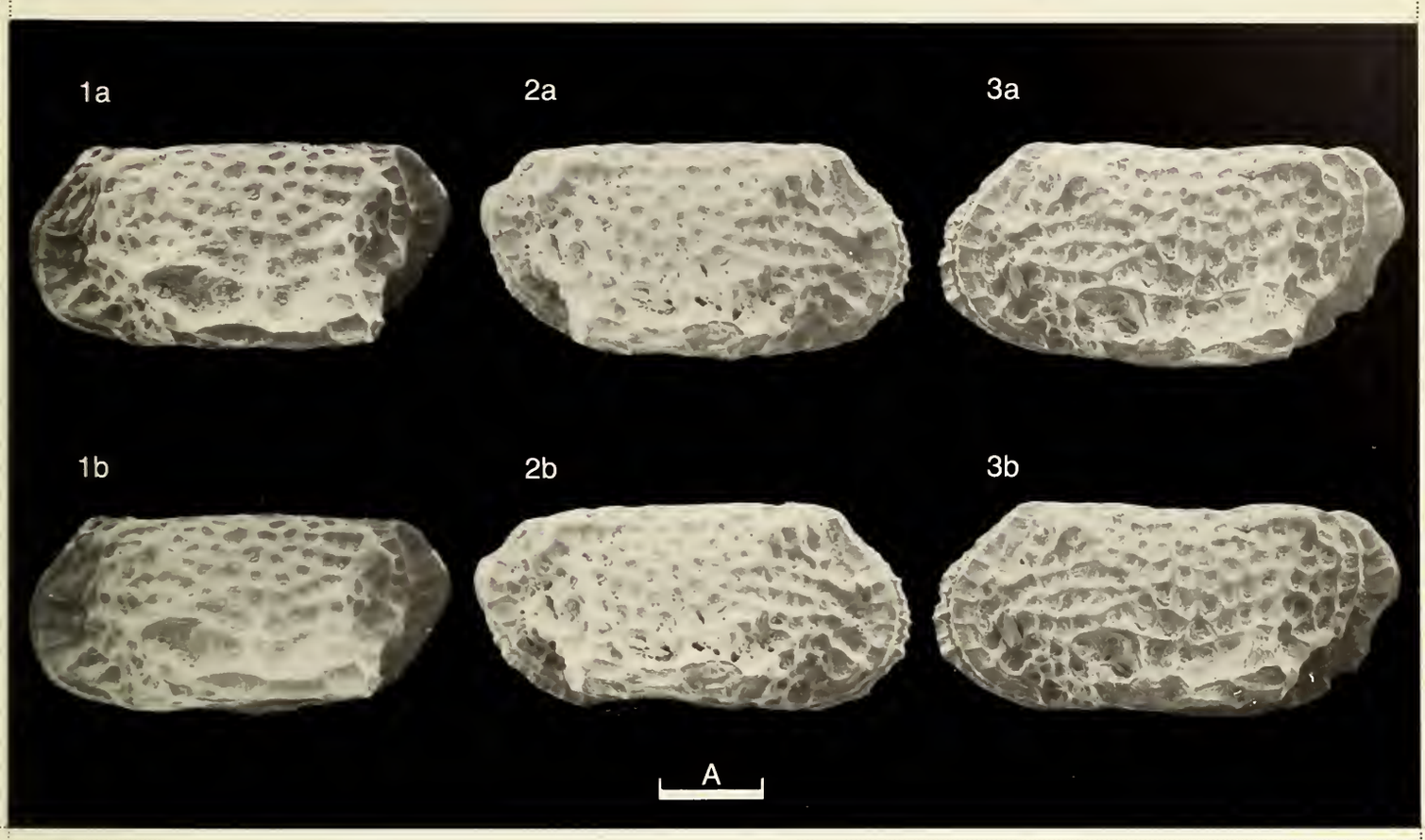
Diagnosis: A small subspecies of *Sagmatocythere* characterised by a straight dorsal margin in female specimens and a slightly concave dorsal margin in males. The ornament is regularly reticulate with the majority of fossae circular to suboval in outline. Fossae of the alar region of the valve are comparatively large and have irregular, angular outlines. In the left valve there is a prominent, posterodorsal loop; this is less prominent in the right valve. Inner lamella broad with a conspicuous, blade-like selvage ventrally.

Remarks: *Sagmatocythere alaefortis gallica* differs from *S. alaefortis alaefortis* Whatley & Maybury (*Stereo-Atlas Ostracod Shells,* **14,** 85–88, 1987) in its smaller size and by having a greater portion of its lateral surface covered by a reticulum. The reticulum is also more regular in *S. alaefortis gallica* than in the nominate subspecies and the posterodorsal protuberance of *S. alaefortis alaefortis* is reduced to a posterodorsal loop in *S. alaefortis gallica.* The distinctive, blade-like selvage of *S. alaefortis gallica* also serves to distinguish it from *S. alaefortis alaefortis.*

Distribution: This subspecies occurs in the Redonian (Upper Pliocene) deposits of Apigné (Le Temple du Cerisier) and of Falleron (approx. lat. 46° 60′N; long. 1° 41′W). It has also been recovered in a mixed sample from NW France, also of Redonian age. See J. –P. Margerel, *Les Foraminifères du Redonian. Systématique, Répartition stratigraphique, Paléoécologie,* Nantes, **1,** 8–26, 1968 for geographical, stratigraphical and sample details.

Explanation of Plate 14, 92

Fig. 1–4, ♂ RV (paratype, **OS 12842,** 460μm long): fig. 1, ext. lat; fig. 2, int. lat.; fig. 3, ant. hinge element; fig. 4, post. hinge element.
Scale A (100μm; × 135), figs. 1, 2; scale B (40μm; × 265), figs. 3, 4.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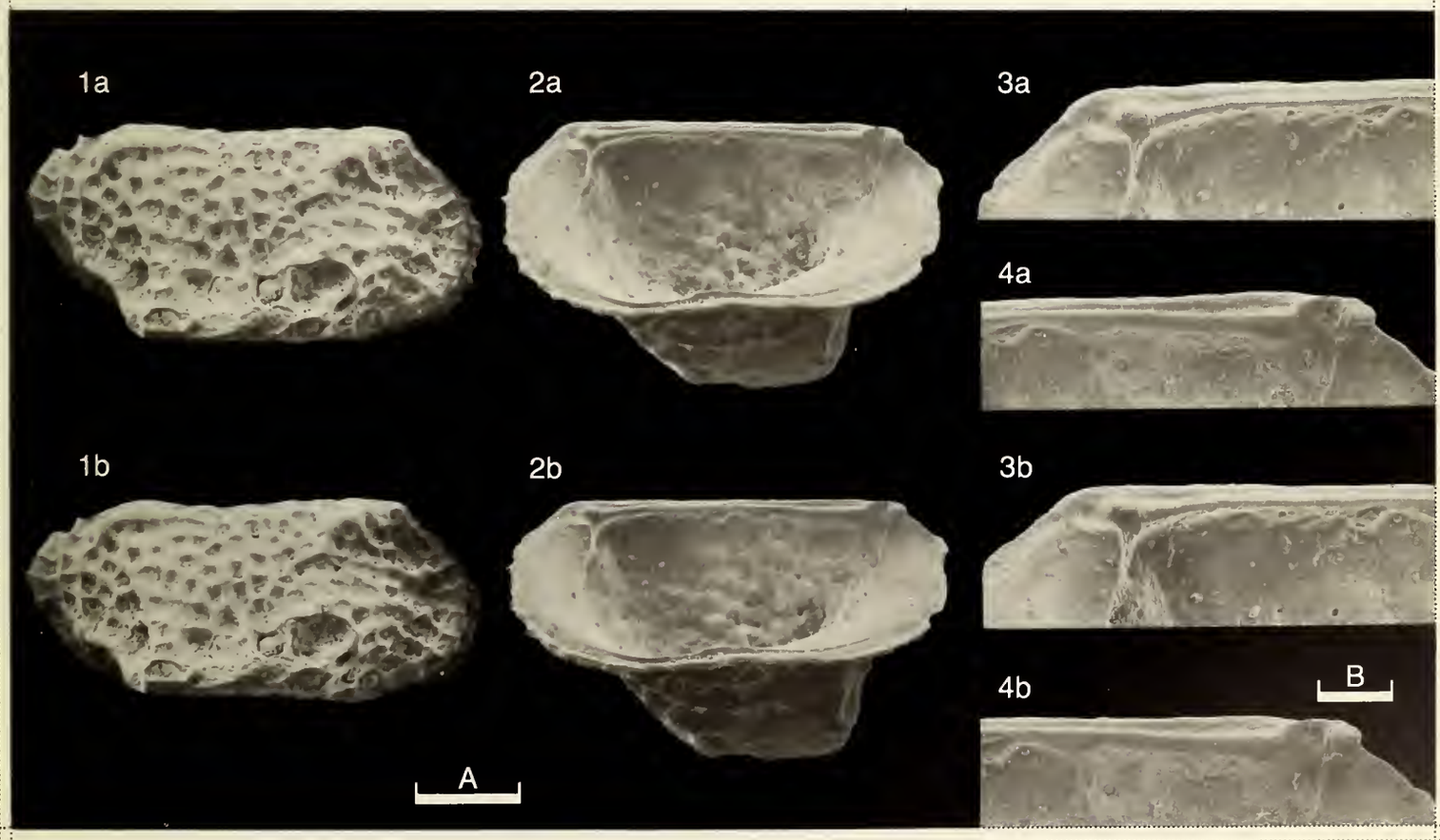
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595.337.14 (118.22) (420 : 162.006.50) : 551.351 + 552.52

ON *SAGMATOCYTHERE WYATTI* MAYBURY & WHATLEY sp. nov.

by Caroline Maybury & Robin Whatley
(University College of Wales, Aberystwyth)

Sagmatocythere wyatti sp. nov.

Holotype: British Museum (Nat. Hist.) no. **OS 12861,** ♀ LV.
[Paratypes: British Museum (Nat. Hist.) nos. **OS 12862 – OS 12865**].

Type locality: Mixed sample, sample no. 7, Vicarage Pit, St. Erth, Cornwall, England (Nat. Grid Ref. SW 556352); Upper Pliocene.

Derivation of name: Latin, in honour of Mr. Antony Wyatt in recognition of his work on 'wobbling continents'.

Figured specimens: British Museum (Nat. Hist.) nos. **OS 12861** (holotype, ♀ LV: Pl. **14,** 94, fig. 1), **OS 12862** (paratype, ♂ LV: Pl. **14,** 94, fig. 2), **OS 12863** (paratype, ♂ RV: Pl. **14**, 94, fig. 3), **OS 12864** (paratype, ♂ RV: Pl. **14,** 96, figs. 1, 3, 4), **OS 12865** (paratype, juv. LV: Pl. **14,** 96, fig. 2). All specimens from the type locality; **OS 12863** and **OS 12865** are from the same sample as the holotype, but **OS 12862** is from a sample of blue clay (no. 25) and **OS 12864** from a mixed sample (no. 1). See C. Maybury, *Taxonomy, Palaeoecology and Biostratigraphy of Pliocene Benthonic Ostracoda from St. Erth and NW France,* unpub. PhD thesis, Univ. Wales, **1,** 3–6, for sample details.

Explanation of Plate 14, 94

Fig. 1, ♀ LV, ext. lat. (holotype, **OS 12861,** 500μm long); fig. 2, ♂ LV, ext. lat. (paratype, **OS 12862,** 460μm long); fig. 3, ♂ RV, ext. lat. (paratype, **OS 12863,** 470μm long).
Scale A (100μm; × 127), figs. 1–3.

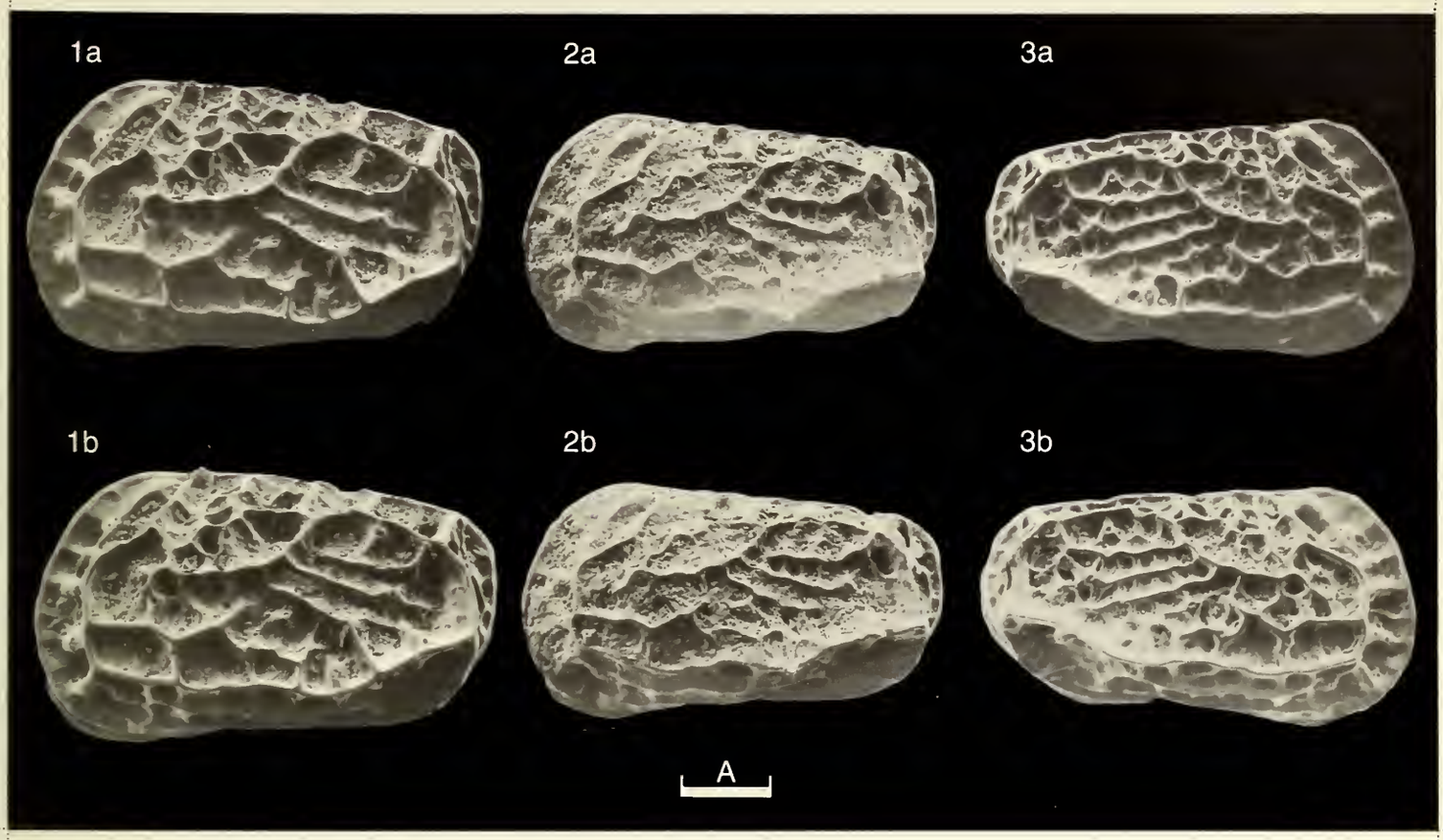
Diagnosis: A small to medium species of *Sagmatocythere* with an irregularly reticulate ornament of large fossae and narrow, blade-like muri. There are four obliquely disposed, subparallel muri posteriorly and a deeply excavated area posteroventrally. Eye tubercle small, smooth, tear-shaped and connecting with a narrow murus which extends anteroventrally, parallel to the anterior margin.

Remarks: This species and the type-species, *Sagmatocythere napoliana* (Puri, 1963) (see J. Athersuch, *Stereo-Atlas Ostracod Shells* **3,** 117–124, 1976), a Miocene to Recent Mediterranean species, are similar in that certain units or 'cells' of the reticulum can be traced in both species. There is, for example, a prominent, polygonal posterior unit and a deeply excavated posteroventral area. In addition, there are 5–7 conjunctive pore conuli anteriorly, the muri of both species are narrow and blade-like and the fossae comparatively large. The two species differ in lateral outline; *S. napoliana* is much more elongate than *S. wyatti* and, whereas the former species has a dorsal margin with a concavity or 'saddle', the dorsal margin of *S. wyatti* is straight and obliquely sloped.

Distribution: In addition to its occurrence in the Upper Pliocene deposits of St. Erth, Cornwall, England (sample nos. 1, 7, 10, 23, 25, 28–29; see C. Maybury, *op. cit.,* for details), this species has been found in a Redonian (Upper Pliocene) sample of shell-rich sand from Le Temple du Cerisier, SW of Rennes (approx. lat. 48° 07′N, long. 1° 41′W), NW France (see, J. –P. Margerel, *Les Foraminifères du Redonien. Systématique, Répartition stratigraphique, Paléoécologie,* Nantes, **1,** 7–13, 1968 for further sample details).

Explanation of Plate 14, 96

Figs. 1, 3, 4, ♂ RV (paratype, **OS 12864,** 460μm long): fig. 1, int. lat.; fig. 3, ant. hinge element; fig. 4, post. hinge element; fig. 2, juv. LV, musc. sc. (paratype, **OS 12865,** 410μm long).
Scale A (100μm; × 127), fig. 1; scale B (10μm; × 740), fig. 2; scale C (40μm; × 330), figs. 3, 4.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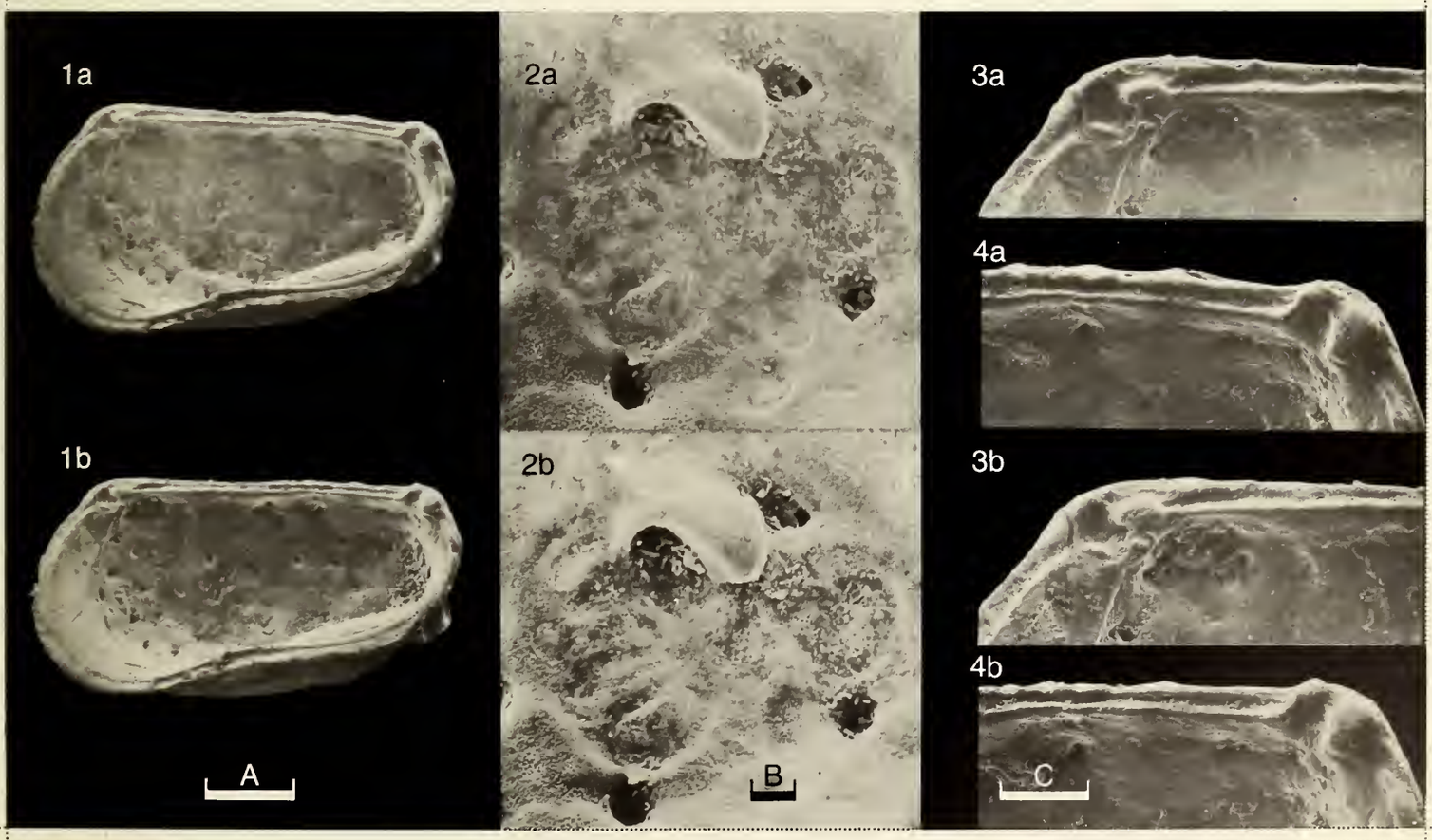
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595.337.14 (118.22.+119.9) (45:161.009.45+261.268 : 162.004.50+411 : 162.002.61+411 : 162.006.55+496.1 : 161.026.38) : 551.351

ON *CARINOCYTHEREIS CARINATA* (ROEMER)

by John Athersuch & John E. Whittaker
(B.P. Research Centre, Sunbury and British Museum (Natural History), London)

Genus *CARINOCYTHEREIS* Ruggieri, 1956
Type-species (by original designation): *Cytherina carinata* Roemer, 1838

Diagnosis: Quadrate trachyleberid with three subparallel ponticulate, sometimes discontinuous carinae; ventral carina strongest. Ventral margin carinate; anterior margin carinate and/or denticulate; posterior margin spinose or denticulate; area between carinae tuberculate or mammilate. Male RV dimorphic; posteroventral region of valve devoid of ventral carina and compressed. Eye tubercle prominent. Hinge amphidont or heterodont; anterior tooth of RV stepped; posterior tooth crenulate.

Seta of second podomere of antennula long in both sexes; endopodite of antenna with three long setae; exopodite dimorphic, long and three-jointed in male, short and possibly only two-jointed in female.

Remarks: *Carinocythereis* differs from *Occlusacythere* Ruggieri & Russo, 1980, in possessing ponticulate carinae.

Expanation of Plate 14, 98

Fig. 1, ♀ car., ext. lt. lat. (**1984.180**, 1050 μm long); fig. 2, ♀ RV, ext. lat. (**1984.181**, 1020 μm long); fig. 3, ♂ RV, ext. lat. (**1984.182**, 1000 μm long).
Scale A (250 μm; ×60), figs. 1–3.

Carinocythereis carinata (Roemer, 1838)

1838 *Cytherina carinata* sp. nov. F.A. Roemer, *Neues Jb Miner. Geogn. Geol. Petrefakt.*, **1838**, 518, pl. 6, fig. 28.
1850 *Cythereis antiquata* sp. nov. W. Baird, *Natural History of British Entomostraca*, Ray Soc., London, 176, pl. 20, fig. 2.
1868 *Cythere antiquata* (Baird); G. S. Brady, *Trans. Linn. Soc. Lond.*, **26**, 417, pl. 30, figs. 17–20.
1960 *Carinocythereis antiquata* (Baird); F. E. Caraion, *Revue Biol. Buc.*, **5**, 123, figs. 4a, b.
1980 *Carinocythereis carinata* Roemer; G. Ruggieri & A. Russo, *Boll. Soc. paleont. ital.*, **19**, 30, pl. 2, fig. 8; text-fig. 2 (neotype).
1981 *Carinocythereis antiquata* (Baird); N. Doruk, *Stereo-Atlas Ostracod Shells*, **8**, 63–70.

Neotype: Designated by Ruggieri & Russo, *op. cit.*, a female RV; housed in the Institute of Palaeontology, University of Modena, Italy, cat. no. **19252**. (Refigured herein, Pl. **14**, 100, fig. 1). The original type material of *C. carinata* is missing (only label exists) from the Roemer Collection, Roemer Museum, Hildesheim, West Germany (Athersuch & Whittaker, 1986, *Br. Micropalaeontologist*, **29**, 9).

Type locality: Castellarquarto, Piacenza, N Italy (approx. lat 45°00′N, long. 9°40′E); Late Pliocene.

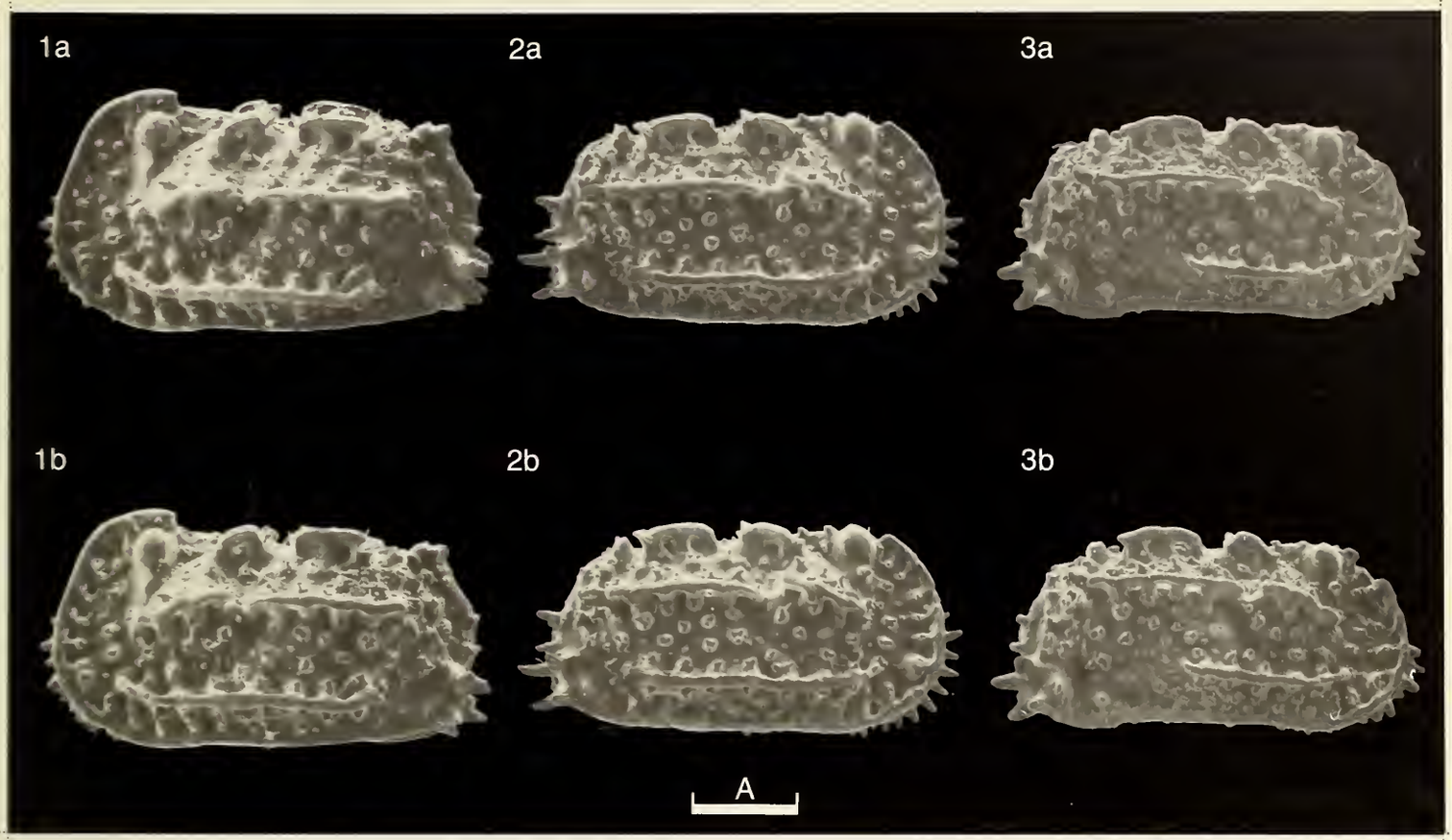
Figured specimens: British Museum (Nat. Hist.) nos. **1984.180** (♀ car.: Pl. **14**, 98, fig. 1; Pl. **14**, 100, fig. 3), **1984.181** (♂ RV: Pl. **14**, 98, fig. 2), **1984.182** (♂ RV: Pl. **14**, 98, fig. 3). **Io 5884** (♂ LV: Pl. **14**, 100, fig. 2), **1984.212** (♂ copulatory appendage: Text-fig. 1).

Institute of Palaeontology, University of Modena, no. **19252** (neotype, ♀ RV: Pl. **14**,100, fig. 1).

1984.180 is from between Plymouth Sound and Start Point, Devon, SW England (lat. 50°10′N, long. 4°00′W), collected at depth of 38m by S. J. Sturrock. **1984.181, 182** are from Unst Haaf (fishing grounds), Shetland (approx. lat. 61°00′N, long. 1°30′W), *ex.* Norman Collection slide no. **1900.3.6.268**, collected 1867. **Io 5884** is from Urla Bay, W Turkey (approx. lat. 38°19′N, long. 26°47′E), collected by N. Doruk (and figured by her (1981, *op. cit.*) as "*C. antiquata* (Baird)"). **1984.212** is from Rothesay Bay, Isle of Bute (approx. lat. 55°50′N, long. 5°05′W), SW Scotland, ex Brady Collection. All Recent. University of Modena no. **19252**, from type locality; Late Pliocene.

Explanation of Plate 14, 100

Fig. 1, ♀ RV, ext. lat. (Neotype, Univ. of Modena no. **19252**, 820 μm long); fig. 2, ♂ LV, ext. lat. (**Io 5884**, 960 μm long); fig. 3 ♀ car., ext. vent. (**1984.180**).
Scale A (250 μm; ×60), figs. 1–3.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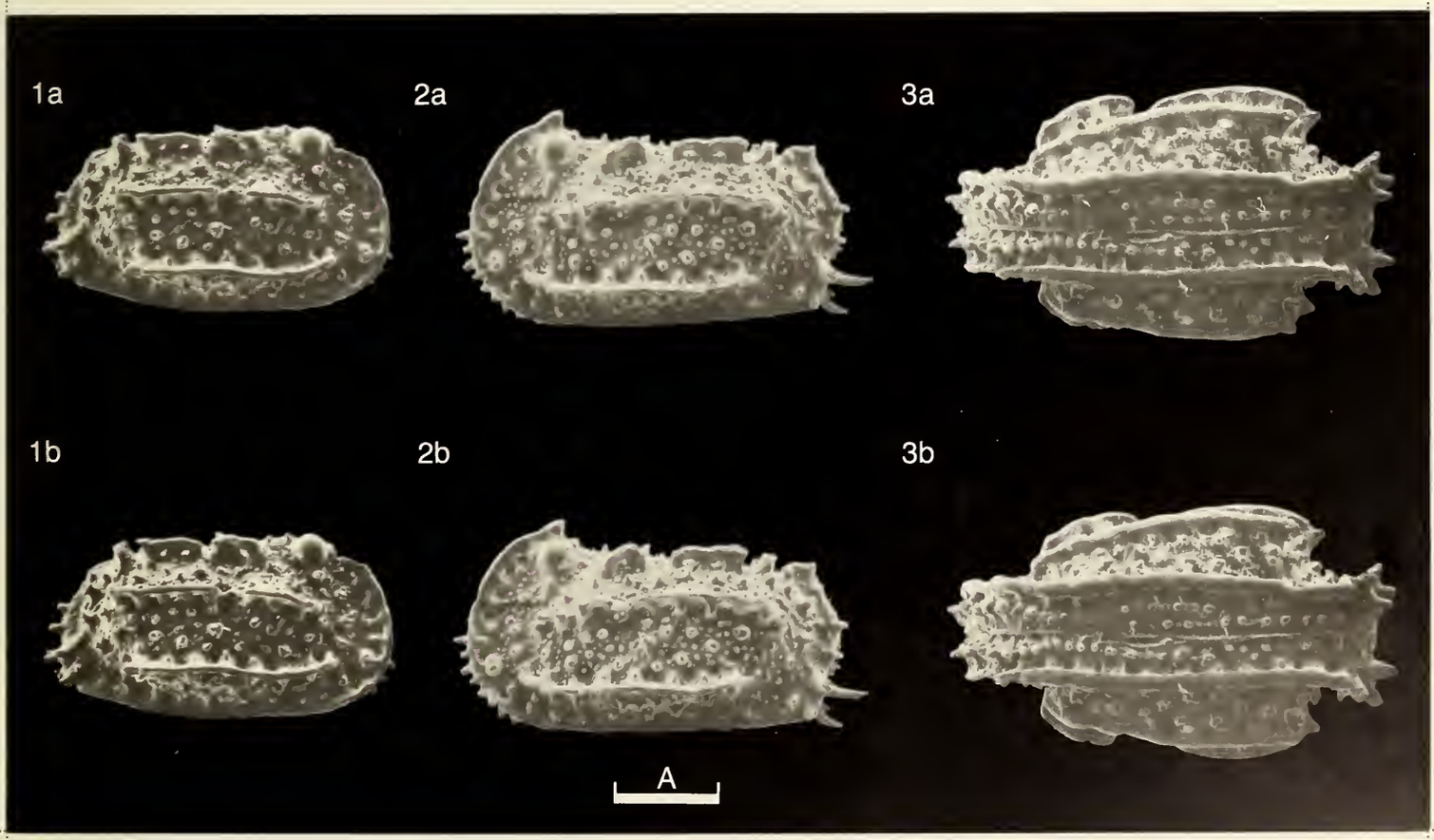
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A

Disgnosis: Anterior margin with marginal carina which is entire and ponticulate throughout. Ventrolateral carina not produced anteriorly. Male copulatory appendages distinctive.

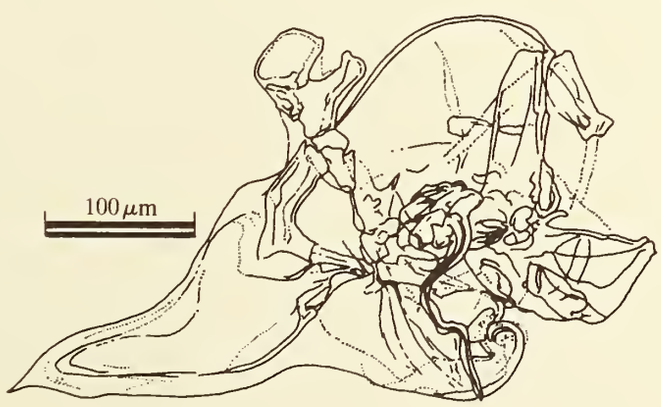
Remarks: In designating a neotype for *Carinocythereis carinata*, Ruggieri & Russo (1980, *op. cit.*) chose a specimen identical to *C. antiquata* (Baird) in all aspects except for size. This was particularly unfortunate since Roemer's original illustration is so unclear as to make its interpretation entirely subjective, whereas *C. antiquata*, although lacking a type specimen, is readily determinable from Baird's original drawing. Nevertheless, *C. antiquata* and the neotype of *C. carinata* are, in our opinion, quite clearly conspecific (compare Pl. **14**, 98, fig. 2 and Pl. **14**, 100, fig. 1) and as a result the latter name takes priority.

C. whitei (Baird) (see J. Athersuch & J. E. Whittaker, *Stereo-Atlas Ostracod Shells*, **14**, 103–110, 1987) differs from *C. carinata* principally in the disposition of the carinae. *C. carinata* possesses a marginal carina ventrally which extends without a break from the posteroventral angle around the anterior margin to the eye tubercle. *C. whitei* has a similar marginal carina which occupies the same position, but in contrast to *C. carinata*, it is replaced anteroventrally by a row of short, stout marginal spines. In addition, the carina does not form such a prominent crest above the eye tubercle. Both species possess ponticulate ventrolateral carinae. In *C. whitei* this carina extends anteriorly to run parallel to the anterior margin. A similar carina is found in *C. carinata* but it is restricted to the ventrolateral region, the anterior part being replaced by a row of four to five small tubercles. *C. whitei* is consistently smaller than *C. carinata* amongst living populations. Fossil specimens of *C. carinata* are also significantly smaller than their Recent counterparts. Minor differences in the male appendages are also useful in distinguishing between these two species.

In the juveniles (A–1, A–2) of both species, the marginal carinae are entire. However, differences seen in the ventrolateral carinae of the adults are also apparent in the juveniles. In addition, the juveniles of *C. whitei* are proportionately less high and more tapered posteriorly then those of *C. carinata*.

Distribution: Recent: British coasts, most frequently in the north (BMNH and Brady Collection, Hancock Museum); French Atlantic Coast (Yassini, 1969, *Bull. Inst. Géol. Bassin Aquitaine*, **7**); Mediterranean (Pugliese *et al.*, 1978, *Pubbl. Staz. zool. Napoli*, **40**); Black Sea (Caraion, *op. cit.*). Pliocene and Pleistocene: Mediterranean (Doruk, *op. cit.* and herein).

There is some evidence (e.g. Pugliese *et al.*, 1978), at least in the Mediterranean, that *C. carinata* (= *C. antiquata*) tends to occur more frequently in deeper water (40–130m) than *C. whitei* (= *C. bairdii*) (20–90m).



Text-fig. 1. ♂ copulatory appendage (**1984.212**). Drawing by D. J. Horne.

595.337.14 (119.1 + 119.9) (429 : 162.005.51 + 420 : 162.004.50 + 420 : 162.005.50 + 420 : 161.000.52 + 564.3 : 161.033.35 + 45 : 161.014.40) : 551.351

ON *CARINOCYTHEREIS WHITEI* (BAIRD)

by John Athersuch & John E. Whittaker
(B.P. Research Centre, Sunbury and British Museum (Natural History), London)

Carinocythereis whitei (Baird, 1850)

1850 *Cythereis Whitei* sp. nov. W. Baird, *The Natural History of British Entomostraca,* Ray Soc., London, 175, pl. 20, figs. 3, 3a.
1865 *Cythereis aspera* sp. nov. G. S. Brady, *Ann.Mag.nat.Hist.,* ser. 3, **16,** 190, pl. 9, figs. 16–19.
1868 *Cythere Whiteii* (Baird); G. S. Brady, *Trans.Linn.Soc.Lon.,* **26,** 416, pl. 30, figs. 21–24.
1969 *Carinocythereis bairdii* sp. nov. F. Uliczny, *Hemicytheridae und Trachyleberididae (Ostracoda) aus dem Pliozän der Insel Kephallinia (Westgrienchenland),* Univ. of Munich, 79, pl. 5, fig. 7; pl. 16, fig. 7.
1971 *Carinocythereis carinata* (Roemer); P. Carbonel & J. Moyes, *Revta esp. Micropaleont.,* **13,** 147–154, pl. 1, figs. 1, 4; pl. 2, figs. 1–9 (*non Cytherina carinata* Roemer, 1838).
1976 *Carinocythereis antiquata* (Baird); G. Bonaduce, G. Ciampo & M. Masoli, *Pubbl. Staz.zool.Napoli,* **40,** 49, pl. 25, figs. 8–10.
1985 *Carinocythereis whitei* (Baird); J. Athersuch, D. J. Horne & J. E. Whittaker, *J. micropalaeontol.,* **4,** 153–158, pl. 1, figs. 12–15; pl. 2, figs. 7, 8.

Lectotype: Designated herein, a female carapace from the Baird Collection, *ex.* slide no. **50.42;** housed in the Brit.Mus. (Nat.Hist.), London, cat. no. **1984.174** (now split into two valves).
Type locality: Tenby, Dyfed, SW Wales (lat. 51° 41′N, long. 4° 43′W); Recent.

Explanation of Plate 14, 104

Fig. 1, ♀ LV, ext. lat. (Lectotype, **1984.174,** 860μm long); fig. 2, ♀ RV, ext. lat. (Lectotype, **1984.174,** 840μm long); fig. 3, ♂ RV, ext. lat. (**1984.173,** 890μm long).
Scale A (250μm; × 75), figs. 1–3.

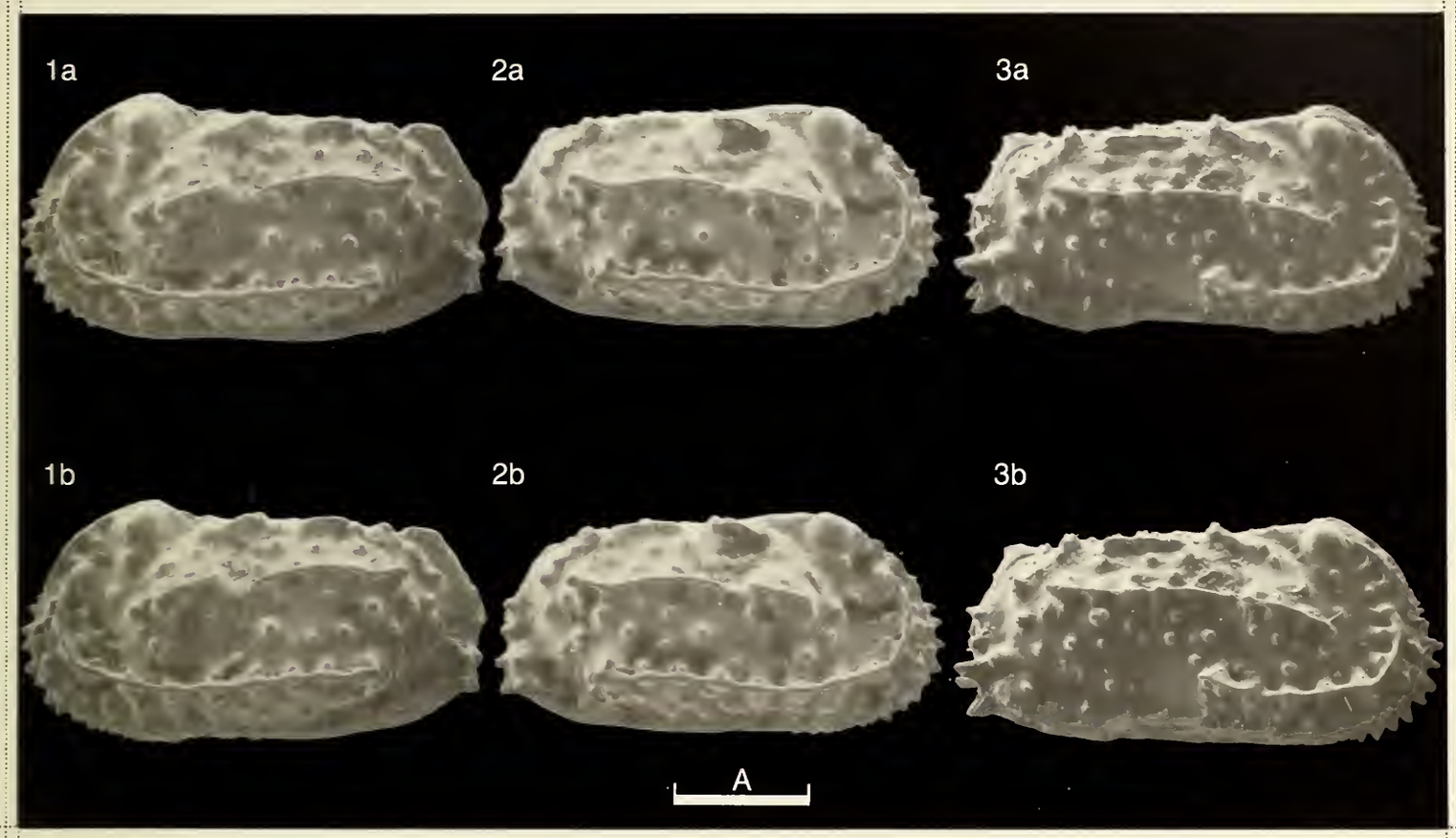
Figured specimens: British Museum (Nat. Hist.) nos. **1984.174** (Lectotype, ♀ LV + RV: Pl. **14,** 104, figs. 1, 2); **1984.173** (♂ RV: Pl. **14,** 104, fig. 3); **OS 12312** (♀ LV: Pl. **14,** 106, fig. 1); **OS 12313** (♀ RV: Pl. **14,** 106, fig. 2); **OS 12314** (♂ RV: Pl. **14,** 106, fig. 3); **1984.175** (juv. A–1 car.: Pl. **14,** 108, fig. 1); **1984.176** (♀ RV: Pl. **14,** 108, fig. 2); **1984.177** (♀ RV: Pl. **14,** 108, fig. 3); **1984.178** (♂ car.: Pl. **14,** 110, fig. 1; copulatory appendage: Text-fig. 1a); **1984.179** (♀ LV: Pl. **14,** 110, figs. 2, 3); **1984.213** (♂ copulatory appendages: Text-fig. 1b).

The lectotype (**1984.174**) is from the sole remaining syntypic slide in the Baird Collection (ex. **50.42**) at the Brit. Mus. (Brit.Hist.); collected by T. R. Jones. **1984.173, 175** and **178** are from the Norman Collection (Brit.Mus. (Nat.Hist.)): **1984.173** and **175** from Dartmouth, Devon, SW England (lat. 50° 21′N, 3° 37′W) (ex slide no. **1911.11.8.M 3372**); **1984.178** from Plymouth, Devon (approx. lat. 50° 22′N, 4° 08′W). **1984.176** and **1984.213** were collected alive by J. Athersuch from coarse sand in Famagusta Bay. Cyprus (approx. lat. 35° 10′N, long. 33° 58′E), water depth 30m, salinity 39.4‰, during November 1973. **1983.177** and **179,** from the Bay of Naples (approx. lat. 40° 50′N, long. 14° 17′E), were kindly provided by Dr. G. Bonaduce. **OS 12312–12314** are from the Nar Valley Clay, East Winch, Norfolk (lat. 00° 32′E, long. 52° 44′N), collected by P. G. Cambridge and B. M. Funnell; Pleistocene (Hoxnian?).

Diagnosis: Anterior margin with carina which is entire and ponticulate dorsally, and disconnected ventrally to form a row of short spines. Ventrolateral carina extends to run parallel to anterior margin. Male copulatory appendage distinctive.

Explanation of Plate 14, 106

Fig. 1, ♀ LV, ext. lat. (**OS 12312,** 745μm long); fig. 2, ♀ RV, ext. lat. (**OS 12313,** 740μm long); fig. 3, ♂ RV, ext. lat. (**OS 12314,** 780μm long).
Scale A (250μm; × 75), figs. 1–3.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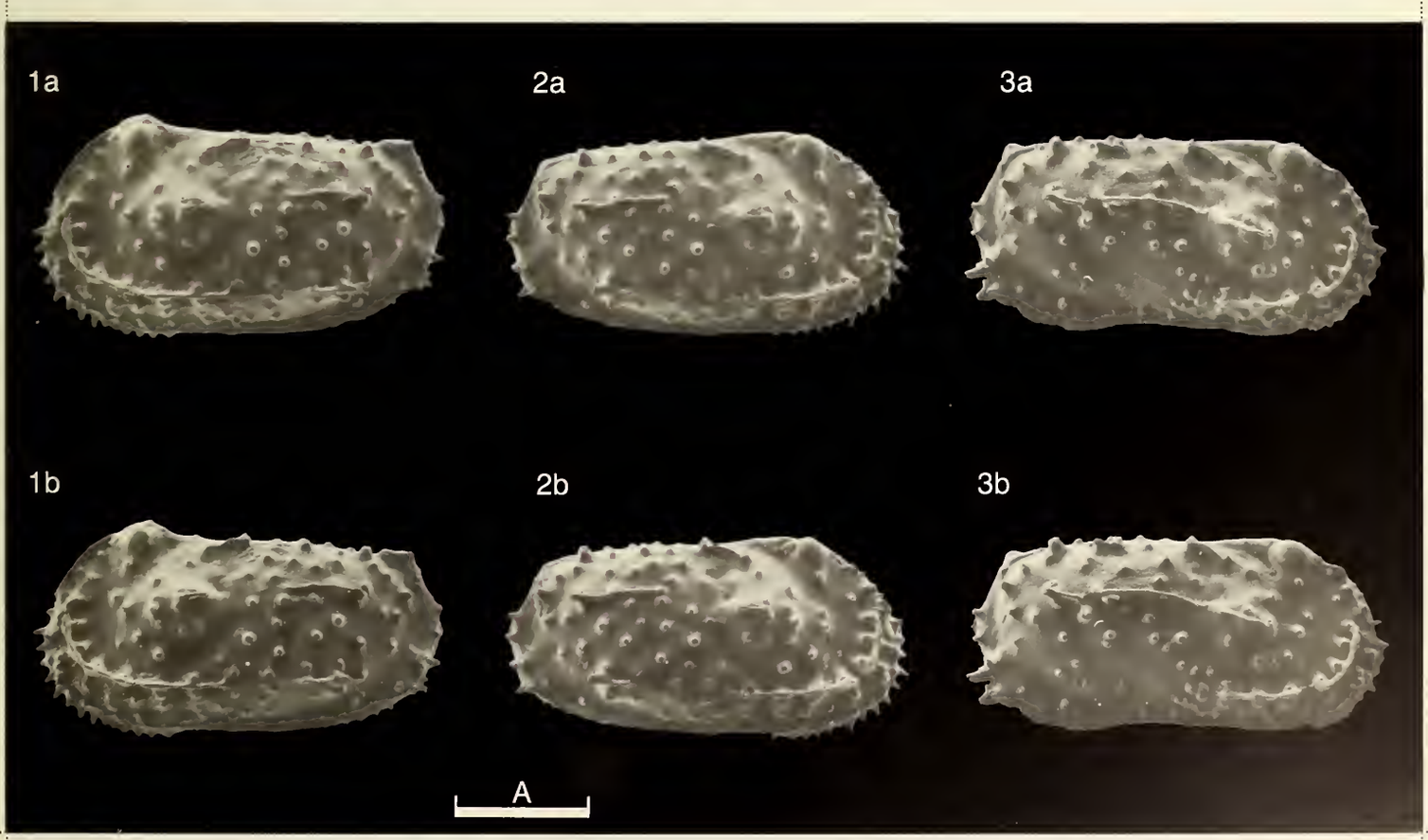
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Remarks: This species was recognised by Baird (1850, *op. cit.*), Brady (1868, *op. cit.*) and Brady, Crosskey & Robertson (1874, *Palaentogr. Soc. Monogr.*) as being distinct from *C. carinata* (Roemer, 1838) = *C. antiquata* (Baird, 1850). All of these authors, however, illustrated and described poorly preserved specimens of *C. whitei*, a fact that has tended to mask the true differences between these two species. (Worn specimens appear more nodose when the carinae are abraded). However, an examination of Baird's syntypes, one of which is illustrated herein (Pl. **14,** 104, figs 1, 2) leaves us in no doubt as to the true identity of *C. whitei*. The main difference between *C. whitei* and *C. carinata* (Roemer) is in the length and disposition of the ventrolateral and anterolateral carinae (see also *Remarks* on *C. carinata* (Roemer) in J. Athersuch & J. E. Whittaker, *Stereo-Atlas Ostracod Shells*, **14,** 97–102, 1987). There is some variation in the development of the carinae in both Recent and fossil forms (cf. Pl. **14,** 106, figs. 2, 3; Pl. 14, 108, figs 2, 3), a factor which seems to be related to calcification of the carapace as a whole.

Until Athersuch, Horne & Whittaker (1985, *op. cit.*) reinstated the name *C. whitei*, G. S. Brady & A. M. Norman (*Scient.Trans.R.Dubl.Soc.,* ser. 2, **4,** 1889) were apparently the last authors to regard it as a distinct species in Britain and the only records under this name in the Mediterranean appear to be those of Ruggieri, 1956 (*Att Soc.ital.Sci.nat.,* **95**) and Uliczny, 1969 (*op. cit.*). Otherwise, the name *whitei* seems to have fallen into disuse and specimens referable to this species have usually been described as either *C. antiquata* (Baird) or *C. bairdii* Uliczny.

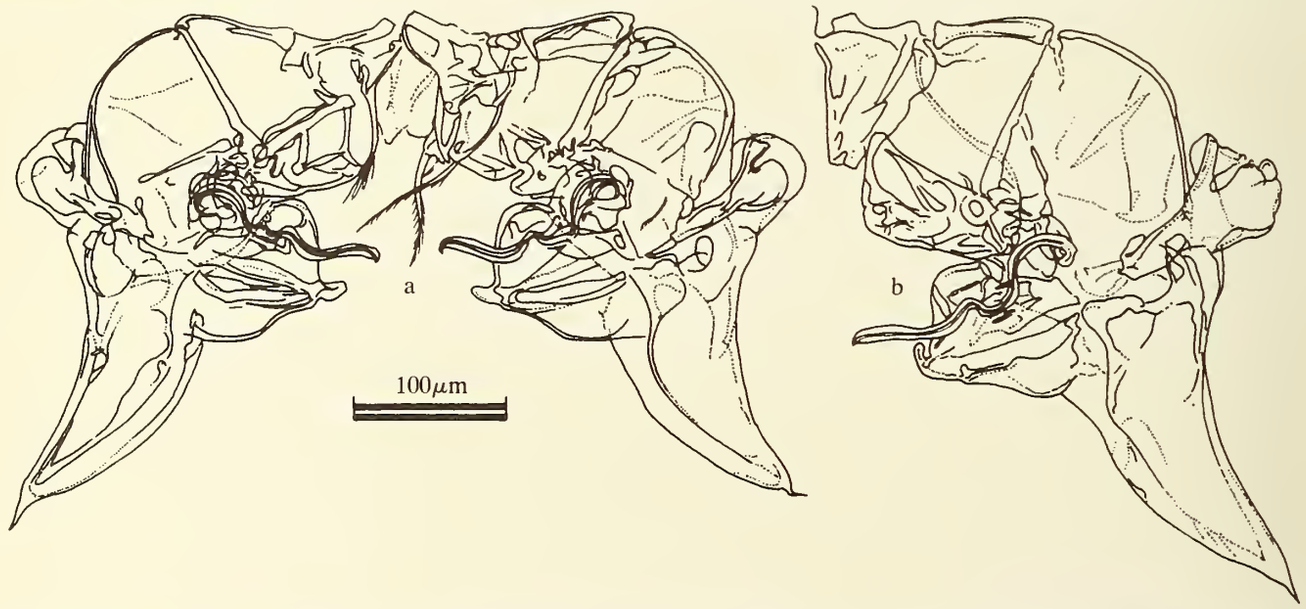
Distribution: Recent: British coasts (most frequently in the south), French Atlantic coast and widespread throughout the Mediterranean (recorded as *C. antiquata* or *C. bairdii*). A sublittoral species found at depths of 20–60m or more.

Fossil: Pleistocene and Pliocene of the Mediterranean (under a variety of names) (Uliczny, *op. cit.*; Ruggieri, *op.cit.*); Pleistocene of England (as *C. aspera*).

Explanation of Plate 14, 108

Fig. 1, juv. A–1 car., ext. lt. lat. (**1984.175,** 700μm long); fig. 2, ♀ RV, ext. lat. (**1984.176,** 890μm long); fig. 3, ♀ RV, ext. lat. (**1984.177,** 780μm long).

Scale A (250μm; × 75), figs 1–3.

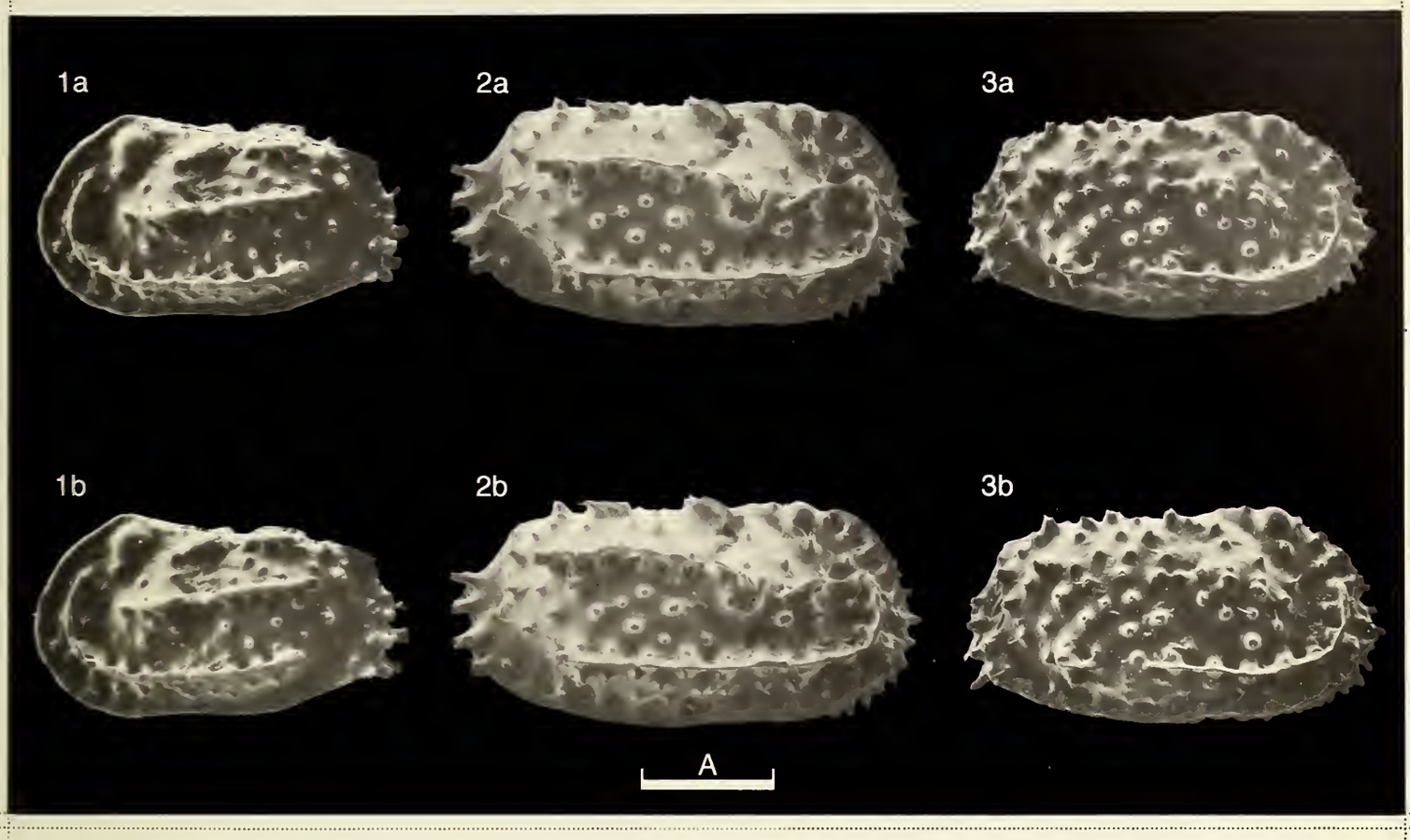


Text-fig. 1. ♂ copulatory appendages: a, (**1984.178**), Recent of Britain; b, (**1984.213**), Recent of the Mediterranean. Drawings by D. J. Horne.

Explanation of Plate 14, 110

Fig. 1, ♂ car., ext. vent. (**1984.178,** 890μm long); fig. 2, ♀ LV, int. lat. (**1984.179,** 800μm long); fig. 3, ♀ LV, int. musc. sc. (**1984.179**).

Scale A (250μm; × 75), figs. 1,2; scale B (50μm; × 310), fig. 3.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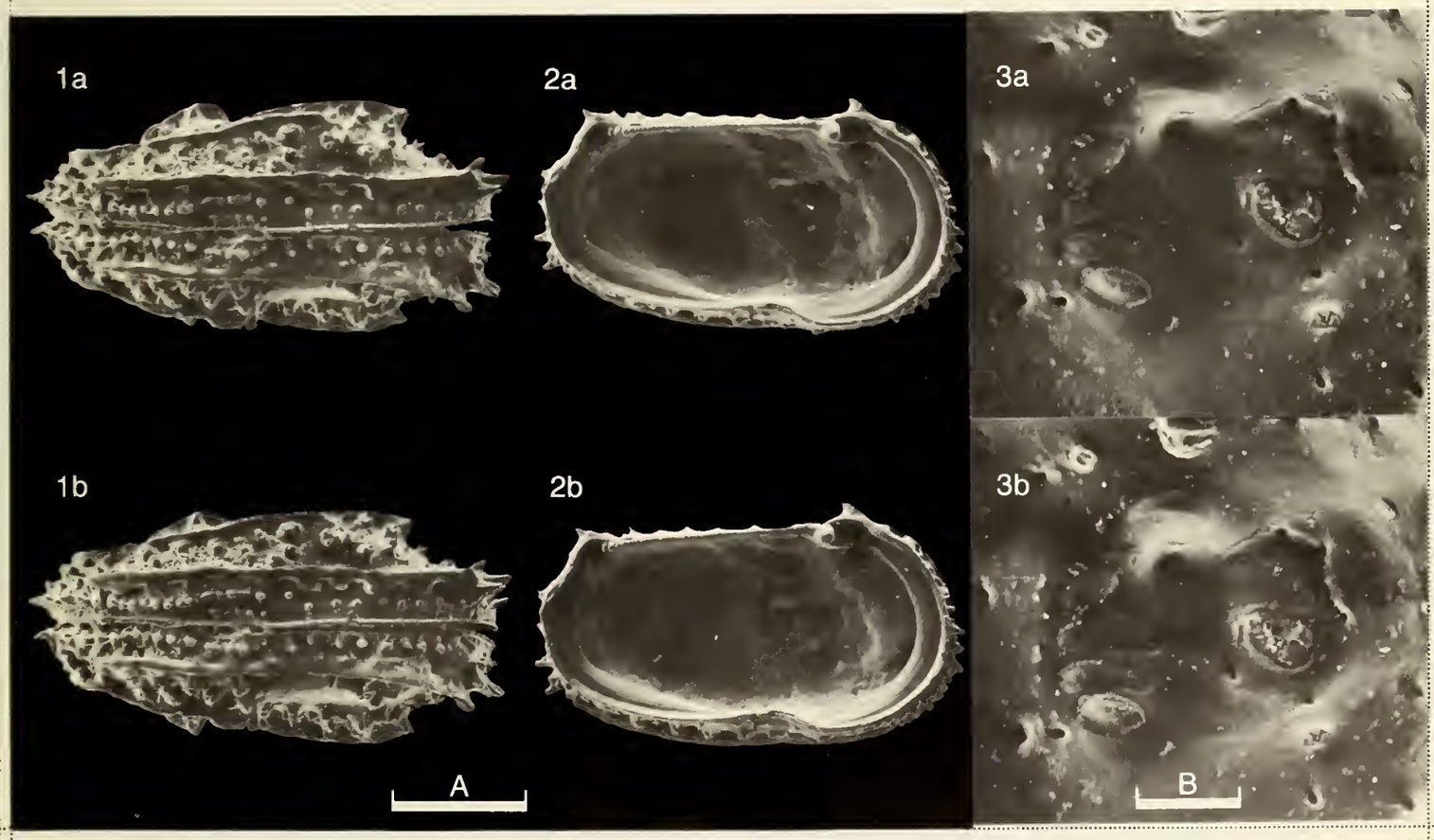
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595.337.14 (119.15–118.21) (510 : 161.103.27) : 551.313.1 + 552.52

ON *ABROTOCYTHERE QUINQUICORNIS* ZHAO gen. et sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Genus *ABROTOCYTHERE* gen. nov.
Type-species: *Abrotocythere quinquicornis* sp. nov.

Derivation of name: Greek, meaning beautiful; in reference to its surface ornamentation + *cythere*.

Diagnosis: Genus small (adults 390–460μm), subrectangular to truncated oval in side view, with well developed posteroventral cyathus in the right valve. Right valve hinge with narrow elongate tooth anteriorly and large rounded tooth posteriorly separated by a groove which is very wide in its anterior half and disappears under the dorsal margin posteriorly. Muscle scar pattern a vertical row of four adductor scars with rounded mandibular and frontal scars.

Remarks: Appendages and soft parts are unknown but the nature of the adductor muscle scar pattern places the new genus in the Cytheracea. The general carapace features place it in the Limnocytheridae and it can be assigned to the Subfamily Timiriaseviinae. Here it has affinities with the *Kovalovskiella (Rosacythere)* and *Theriosynoecum* groups of Colin & Danielopol (*Palaeobiologie Continentale* XI, 1, 13–17, 1980). Although the hinge structure is very similar, it differs from *Theriosynoecum* in the general nature of the ornamentation as well as in shape, which in *Abrotocythere* is much more rectangular and less rounded, particularly posteriorly. It is closest to the Cretaceous genus *Rosacythere* Colin, 1980 from which it differs most markedly in having the positive elements of the hinge structure in the right valve. In size (390–460μm) it is also much smaller than both *Rosacythere* (560–600μm) and *Theriosynoecum* (620–1420μm). *Abrotocythere* may be regarded as a Tertiary derivative of *Rosacythere* and may thus belong in the *Kovalovskiella* group.

Explanation of Plate 14, 112

Fig. 1, 2, RV, (holotype, **103070,** 390μm long): fig. 1, ext. lat., fig. 2, ext. dors. Scale A (100μm; × 245), figs. 1, 2.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China; coll. no. **103070, RV.** [Paratypes: eight valves, Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103071, 90870–90876**].

Type locality: Section at Gaocanzi, Zhongshui town, Weining County, Guizhou province, SW China; lat. 27° 20′N, long. 103° 39′E. From a marl lens in mudstones of Miocene (or possibly Oligocene) age.

Derivation of name: Latin; reference to the five horn-like spines or pore conuli in the posterior half of the shell.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103070** (holotype, RV: Pl. **14,** 112, figs. 1, 2), **103071** (paratype, RV: Pl. **14,** 114, figs. 1, 2). Both figured specimens are from the type locality and horizon.

Diagnosis: A small (390μm) species of *Abrotocythere,* subrectanglar in side view with strong infracurvature, the anterodorsal margin sloping gently at about 45° to the vertical. Straight dorsal and ventral margins are parallel, slightly concave in their median part and truncated posteriorly by the vertical posterior margin. Left valve slightly larger than right valve with ventral overlap medianly and a well developed posteroventral cyathus in the right valve. Wide, shallow "V" shaped sulcus anterodorsally giving a dorsal view reminiscent of a calabash. Primary puncta pentgonal or subrounded with secondary pitting. Pore canal openings are clearly visible at the top of the pore conuli and on the ridges of the reticulation anteriorly. Inner lamella narrow with very small vestibules at each end, selvage strong. Hinge typical of genus. A vertical row of four adductor scars lies on a platform in front of the strongly vaulted posterior part of the shell and these scars are also seen on the external surface. There are two oval mandibular scars anteroventrally and a round frontal scar level with the topmost adductor scar.

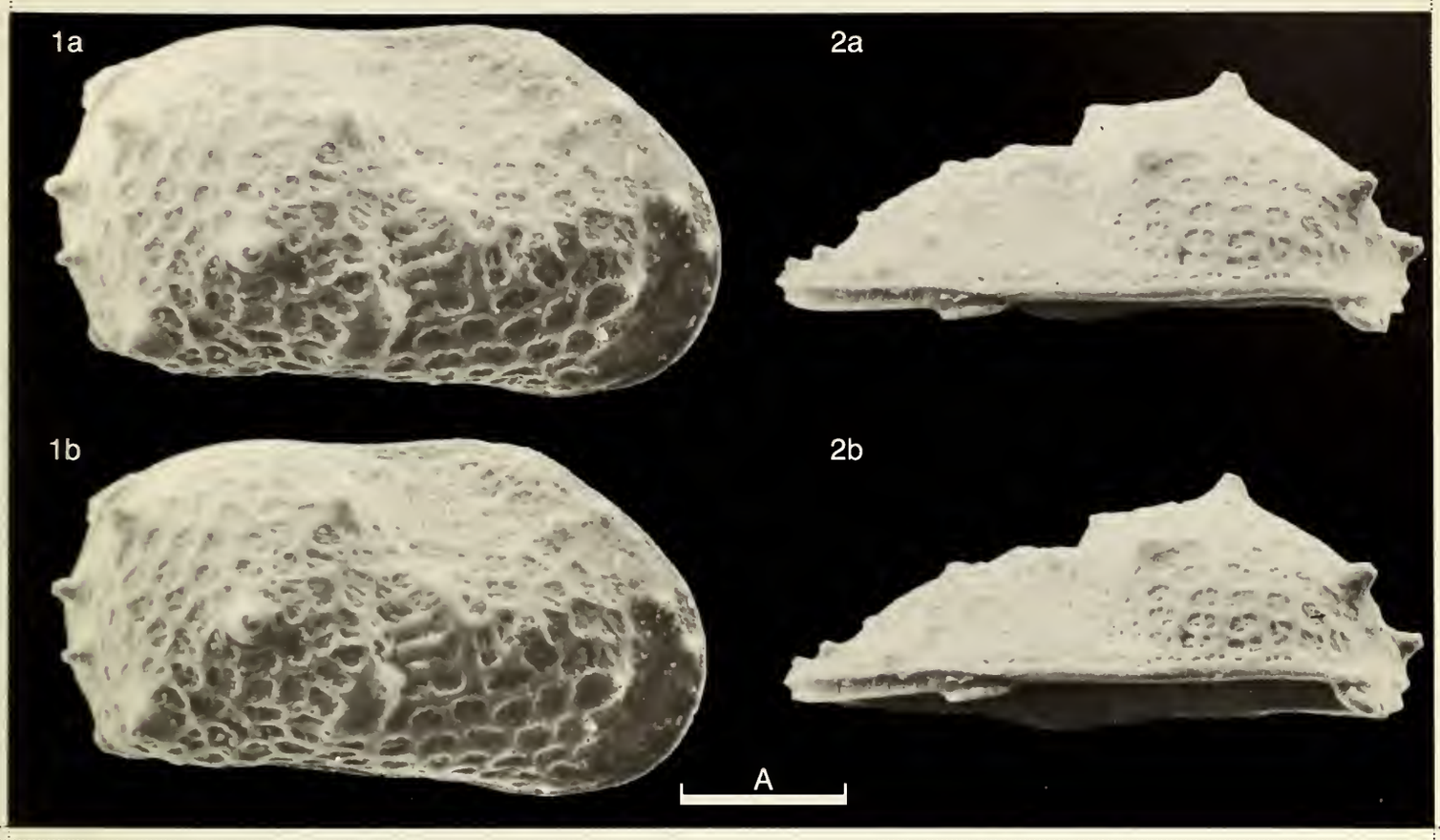
Remarks: *A.quinquicornis* differs from *A.ovata* Zhao (*Stereo-Atlas Ostracod Shells,* **14,** (26) 115–118, 1987) in its smaller size and in the development of five prominent tubercles/spines posteriorly.

Distribution: *Abrotocythere quinquicornis* and *Abrotocythere ovata* Zhao have been found in the Guizhou Province, SW China in beds of (?) Oligocene-Miocene age; they are associated with gastropods which are thought to occupy an oligohaline niche.

Acknowledgment: This study was undertaken while a visiting Research Scholar in the Department of Geology, University of Hull, England.

Explanation of Plate 14, 114

Fig. 1, 2, RV (paratype, **103701,** 390μm long); fig. 1, int. lat., fig. 2, ext. dors. Scale A (100μm; × 248), figs. 1, 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A

Stereo-Atlas of Ostracod Shells 14 (26) 115-118 **(1987)**
595.337.14 (118.15–118.21) (510 : 161.103.27) : 551.313.1 + 552.52

ON *ABROTOCYTHERE OVATA* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Abrotocythere ovata sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103072**; RV.
[Paratypes: two valves, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103073(1)–103074(2)**].

Type locality: Section at Gaokanzi, Zhongshui town, Weining county, Guizhou province, SW China, lat. 27° 20′N, 103° 39′E. From a marl lens in mudstones of Miocene (or possibly Oligocene) age.

Derivation of name: Referring to the oval outline of the shell.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103072** (holotype, RV: Pl. **14,** 116, fig. 1; Pl. **14,** 118, fig. 2), **103073(1)** (paratype, RV: Pl. **14,** 118, fig. 1), **103073(2)** (paratype, LV: Pl. **14,** 116, fig. 2). All of the figured specimens are from the type locality and horizon.

Diagnosis: Small, truncated oval in lateral view, cordate in dorsal view. Dorsal and ventral margins subparallel. Right valve with strong posteroventral cyathus. Wide, shallow V-shaped sulcus anterodorsally. Surface with subrounded fossae with secondary pitting, in some areas arranged in the manner of fish scales. Size of fossae variable becoming smaller anterodorsally near the shallow V-shaped sulcus. The elongate, round, posteroventral tubercle lies slightly behind mid-length and is inclined downwards anteriorly at an angle of about 30° to the horizontal. Inner lamella narrow

Explanation of Plate 14, 116

Fig. 1, RV, ext. lat. (holotype, **103072,** 460μm long); fig. 2, LV, ext. lat. (paratype, **103073(2),** 445μm long). Scale A (100μm; × 205), figs. 1; scale B (100μm; × 177), fig. 2.

Diagnosis: (cont.) with very small vestibule anteriorly. Hinge characteristic of the genus with elongate anterior tooth plate, large rounded posterior tooth and connecting groove in the right valve. A vertical row of four adductor scars lies on a platform in front of the swollen posterior part of the shell. There are two small rounded and closed mandibular scars anteroventrally.

Remarks: This species occurs with *Abrotocythere quinquicornis* Zhao (*Stereo-Atlas Ostracod Shells,* **14,** 111, 1987) to which it is obviously closely related. It differs in a number of important respects. With a length generally 450–460μm, *A.ovata* is consistently larger than *A.quinquicornis* (390μm). Ornamentation also differs consistently. The present species, whilst showing the basic elements of sulcus, reticulation and tuberculation differs in a number of important respects. *A.ovata* lacks the five prominent tubercles/spines of *A.quinquicornis.* In this it might simply be considered a morph of the latter species but for the fact that the tubercle that is developed is elongated in a direction virtually at right angles to the direction the one which occurs in roughly the same position in *A.quinquicornis.* They can not be regarded as homologous and the pattern of fossae round these respective tubercles is also quite different. Similarly these same differences suggest that this is not a case of sexual dimorphism and the current taxon is regarded as a species different from, but co-eval with, *A.quinquicornis.*

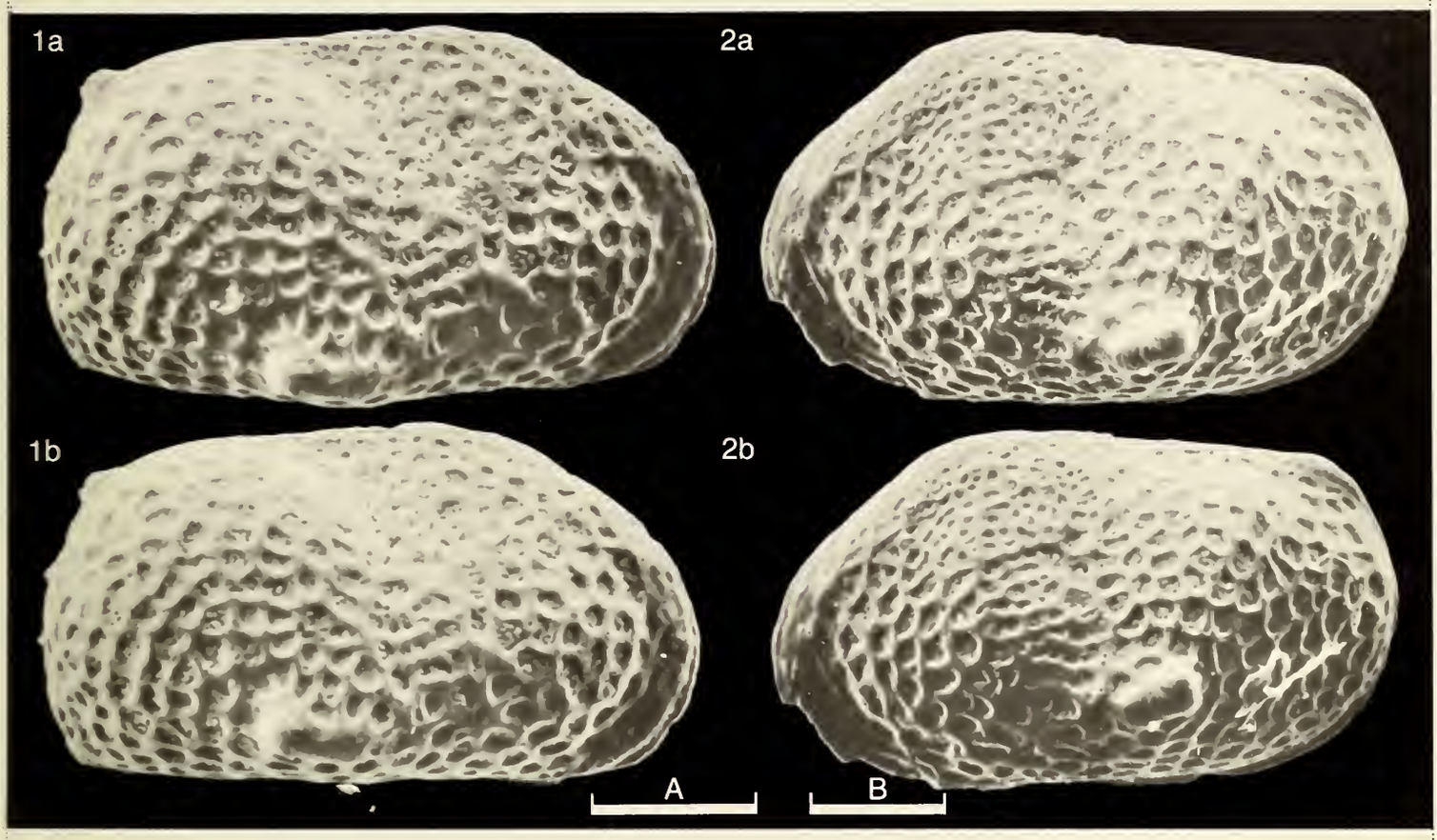
A.ovata is somewhat similar in outline to *Kovalevskiella phreaticola* (Danielopol) (Colin and Danielopol, *Paleobiologie Continentale,* **XI, 1,** pl. 2, fig. 1, 2, 1980) and other *Kovalevskiella* species (Colin and Danielopol, *Paleobio, Contin.,* **XI, 1,** 13–14, pl. 1–5, 1980), but there are clear differences in ornamentation, hinge structure and muscle scar pattern.

Distribution: *Abrotocythere ovata* and *Abrotocythere quinquicornis* (*Stereo-Atlas Ostracod Shells,* **14,** 111, 1987) have been found in Guizhou Province, SW China, in beds of Miocene (or possibly Oligocene) age. They are associated with gastropods which are thought to have lived in an oligohaline habitat.

Acknowledgment: This study was undertaken while a visiting Research scholar in the Department of Geology, University of Hull, England.

Explanation of Plate 14, 118

Fig. 1, RV int. lat. (paratype, **103073(1),** 450μm long); fig. 2, RV ext. dors. (holotype, **103072,** 460μm long). Scale A (100μm; × 212), figs. 1, 2.


1a
2a
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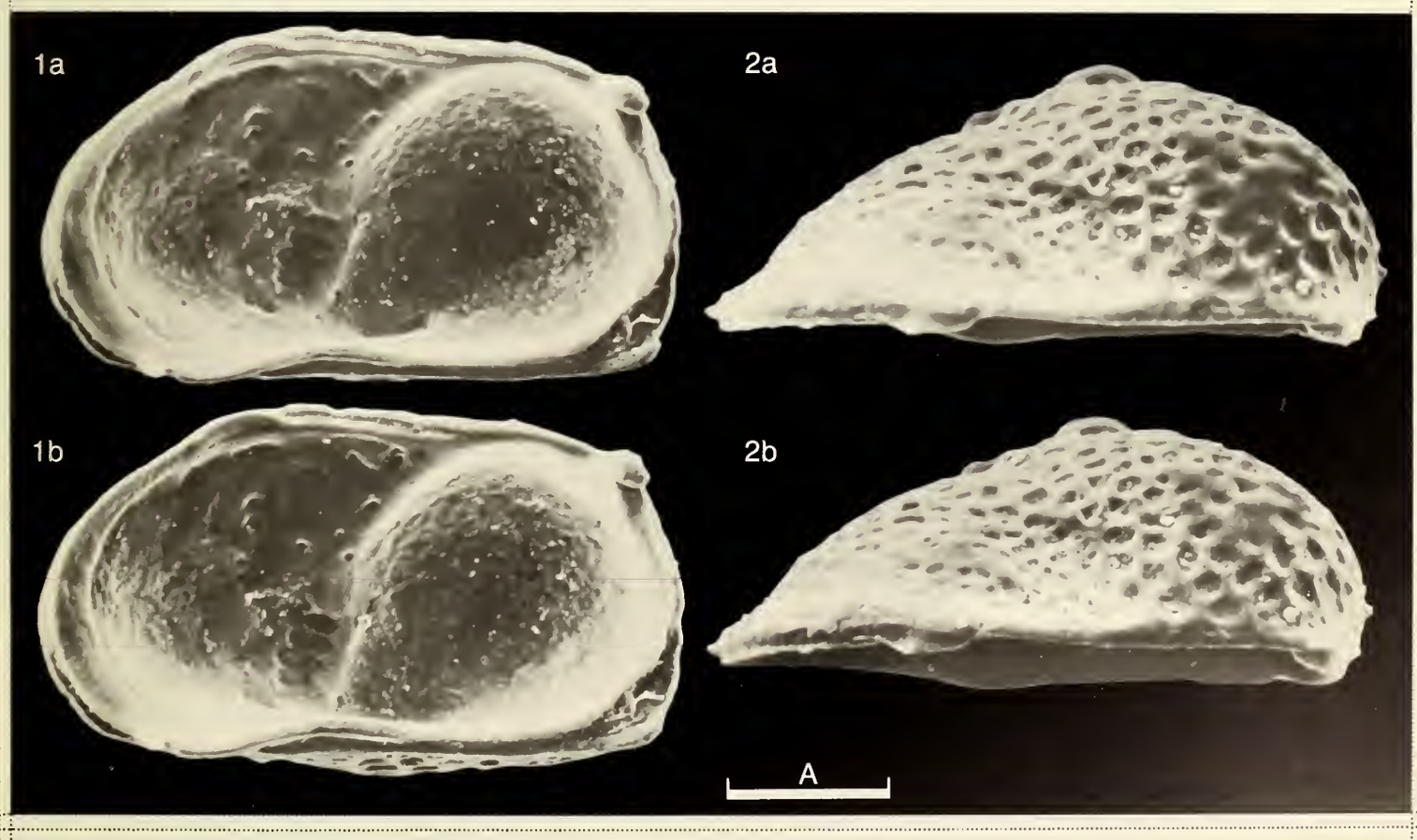
2b
A
B


1a
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2b
A

595.337.14 (119.1) (510 : 161.104.26) : 551.312.4 + 552.52

ON *LEUCOCYTHERE WEININGENSIS* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Leucocythere weiningensis sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103064;** carapace.

[Paratypes: valve and carapace, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103065–103066**].

Type locality: Borehole CK–17 at Caohai Lake, Weining County, Guizhou Province, SW China; lat. 26° 51′N, 104° 12′E. At a depth of 21m from the surface; black mudstones of Pleistocene age.

Derivation of name: From its occurrence in the Weining County, Guizhou Province, SW China.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103064** (holotype, car.: Pl. **14,** 120, figs. 1, 2), **103065** (paratype, RV: Pl. **14,** 122, fig. 1.), **103066** (paratype, car.: Pl. **14,** 122, fig. 2). All of the figured specimens are from the type locality and horizon.

Explanation of Plate 14, 120

Figs. 1, 2, car. (holotype, **103064,** 470μm long): fig. 1, ext. lt. lat.; fig. 2, ext. rt. lat.
Scale A (100μm; × 201), figs. 1, 2.

Diagnosis: Carapace small; dorsal margin straight, inclined towards posterior; ventral slightly concave in the median part. Highest and widest about one-third length from the anterior end. Surface reticulate with secondary pitting in the fossae. Two vertical dorsal sulci in the anterior half of the shell, the most prominent lying just in front of mid-length. Pores occur at the intersections of some muri of which two or three anteriorly, and about half a dozen posteriorly form fairly prominent pore conuli. There is a small backward projecting spine at about three-quarters length and at about one-fifth the height above the ventral margin. Some specimens show a sulcus immediately behind this spine (Pl. **14,** 120, fig. 2). Vertical row of four adductor scars placed low on the shell on the anterior side of the internal ridge, with two rounded mandibular scars more ventrally. Hinge merodont with straight toothplate subdivided into three toothlets anteriorly, a locellate groove and a prominent elliptical tooth posteriorly in the right valve.

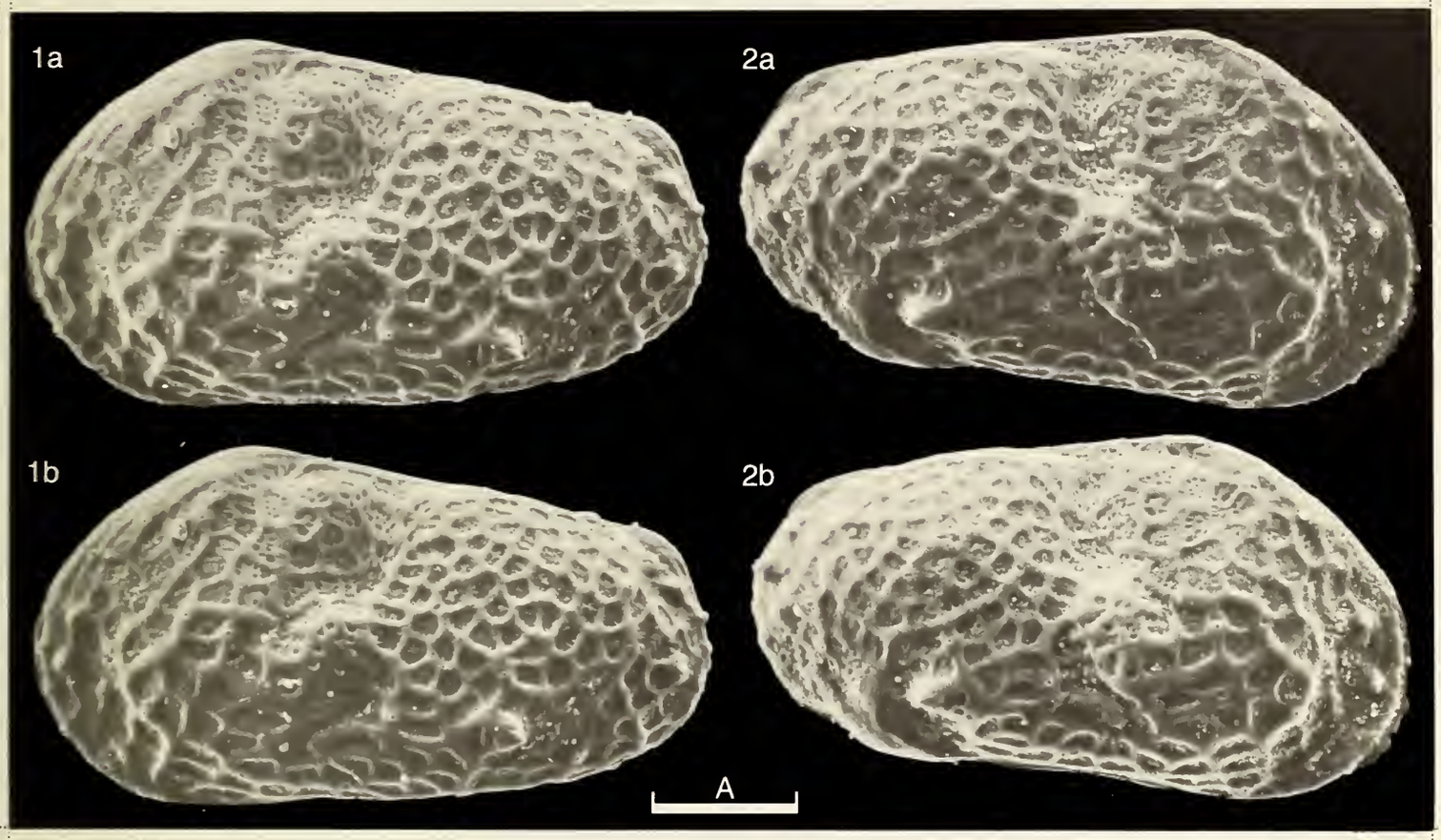
Remarks: This species is related to *Leucocythere plena* Zhao (see *Stereo-Atlas Ostracod Shells,* **14,** 123, 1987), but the latter is more swollen posteriorly, with a concave posterior outline in dorsal view, and the hinge structure is less well developed.

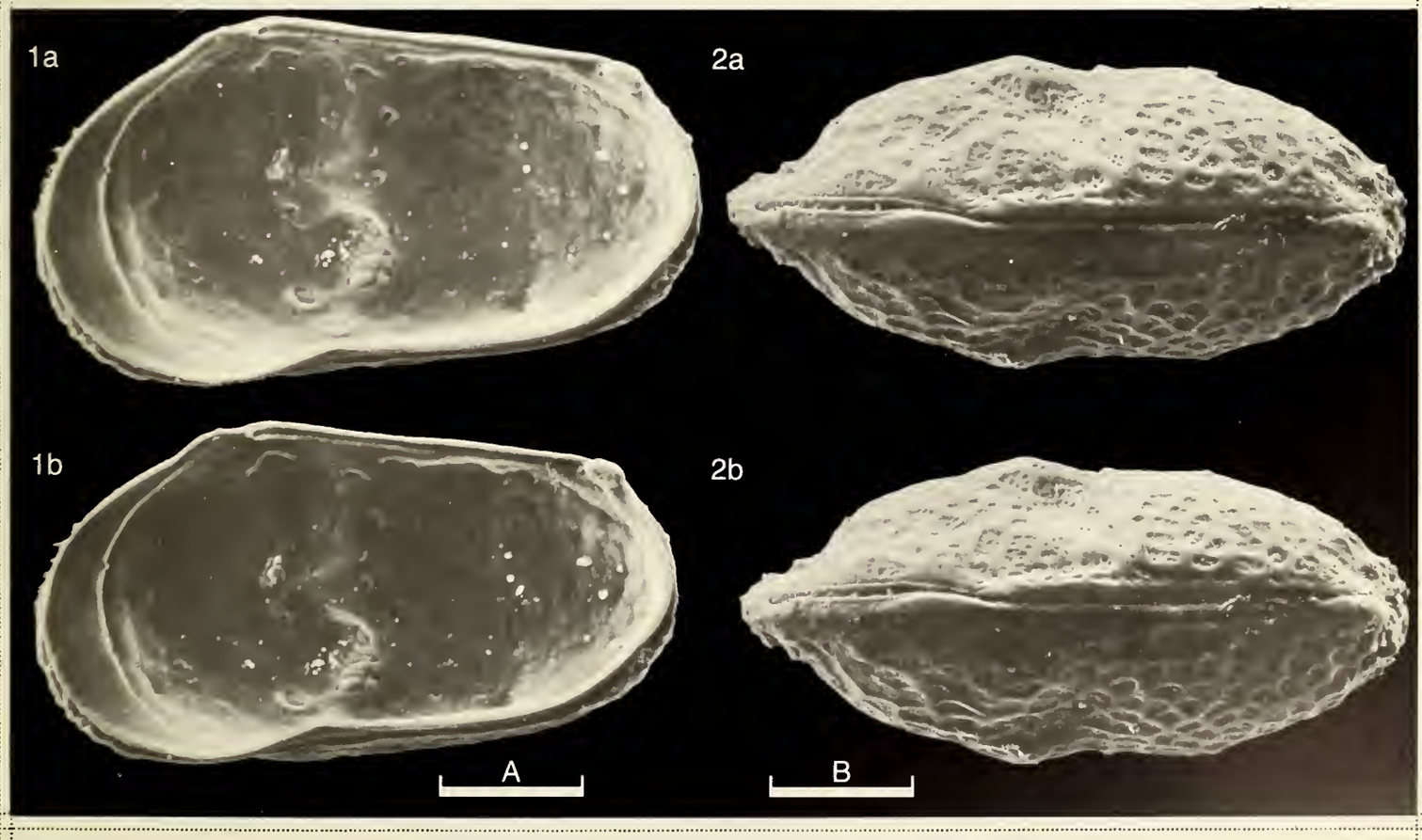
Distribution: This species has so far only been found in Pleistocene deposits in Guizhou Province, SW China.

Acknowledgement: This study was undertaken as a visiting research scholar at the Department of Geology, University of Hull, England.

Explanation of Plate 14, 122

Fig. 1, RV int. lat. (paratype, **103065,** 450μm long); fig. 2, car., ext. dors. (paratype, **103066,** 470μm long).
Scale A (100μm; × 210), fig 1; scale B (100μm; × 205), fig. 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A
B

595.337.14 (119.1) (510 : 161.104.26) : 551.312.4 + 552.52

ON *LEUCOCYTHERE PLENA* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Leucocythere plena sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103067**; carapace.

[Paratypes: valve and carapace, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103068–103069**].

Type locality: Borehole CK–17 at Caohai Lake, Weining County, Guizhou Province, SW China; lat. 26° 51′N, 104° 12′E. At a depth of 21m from the surface; black mudstones of Pleistocene age.

Derivation of name: From the latin *plenus,* plump, stout; in reference to the swollen posterior half of the shell.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103067** (holotype, car.: Pl. **14,** 124, figs. 1, 2), **103068** (paratype, RV: Pl. **14,** 126, fig. 1.), **103069** (paratype, car.: Pl. **14,** 126, fig. 2). All of the figured specimens are from the type locality and horizon.

Explanation of Plate 14, 124

Figs. 1, 2, car. (holotype, **103067,** 520μm long): fig. 1, ext. lt. lat.; fig. 2, ext. rt. lat.
Scale A (100μm; × 178), figs. 1, 2.

Diagnosis: Small to medium sized carapace with gently concave dorsum inclined posteriorly. Highest anteriorly at about one-third the length. Two dorsal vertical sulci in the anterior half of the shell; sub-central tubercle; posterior half of shell swollen. Sparse pore conuli developed over the surface of the shell and developed posteriorly where they form distinct tubercles. Ornamentation of subdued reticulation with round secondary pits occupying the fossae. Ten marginal pore canals anteriorly. Vertical row of four adductor scars in the ventral part of the shell and lying on the anterior flank of the median internal ridge which defines the posterior limit of the sub-central tubercle. Hinge merodont with narrow, well-defined anterior and posterior toothplates with thin, sinuous groove in between.

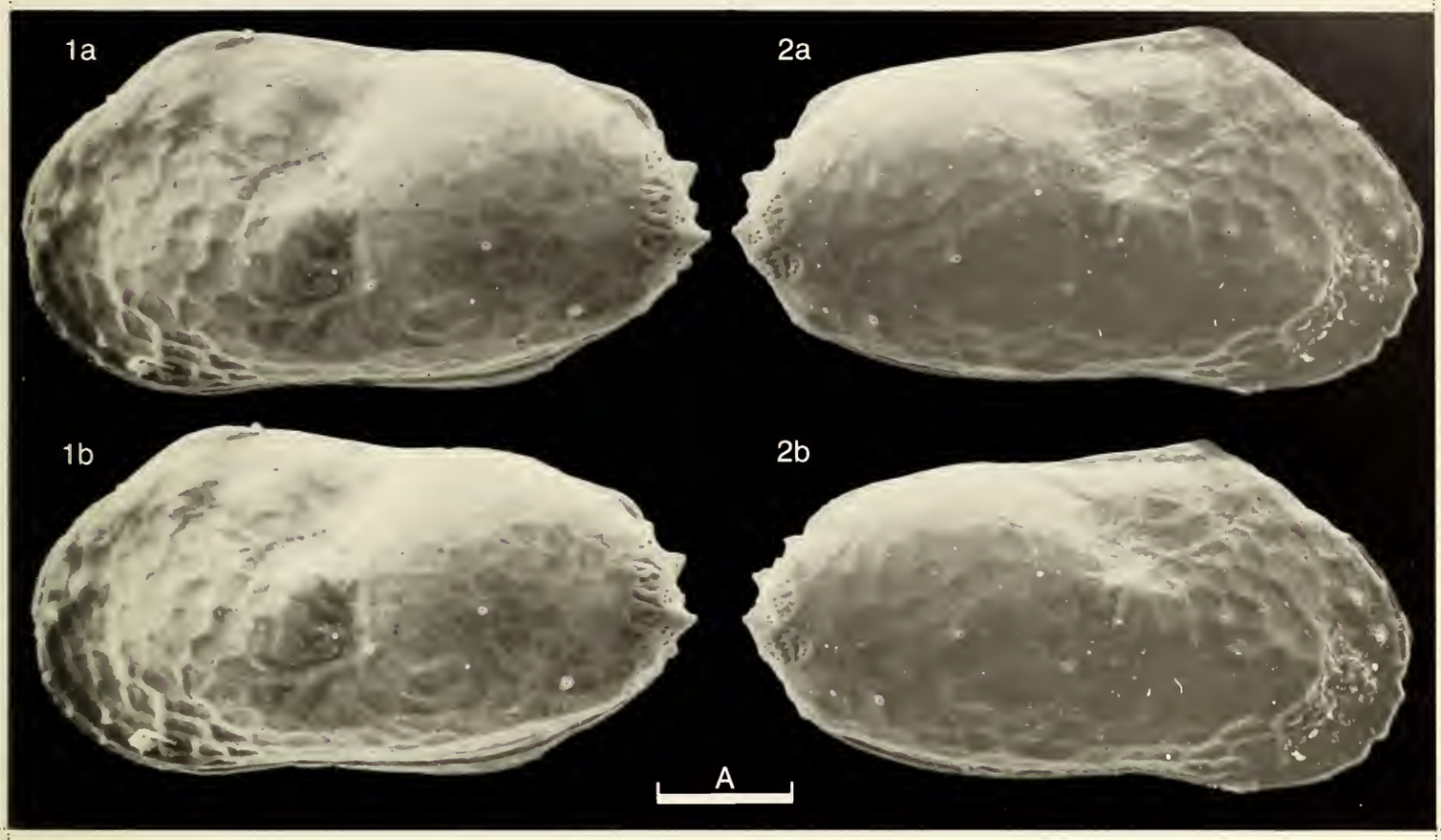
Remarks: This species is closely related to *L.weiningensis* Zhao (see *Stereo-Atlas Ostracod Shells,* **14,** 119, 1987) but differs in its concave dorsum, less differentiated hinge, subdued ornamentation and marked posterior swelling. The present species is also related to *L.subquadrata* Huang & You, 1982 (Huang, Yang & You, *Palaeontology of Xizang,* Book **IV,** 377, fig. 6, pl. 14, fig. 3, 1982, Beijing), but that species lacks the carapace sulci and does not show the posterior inflation of *L.plena.*

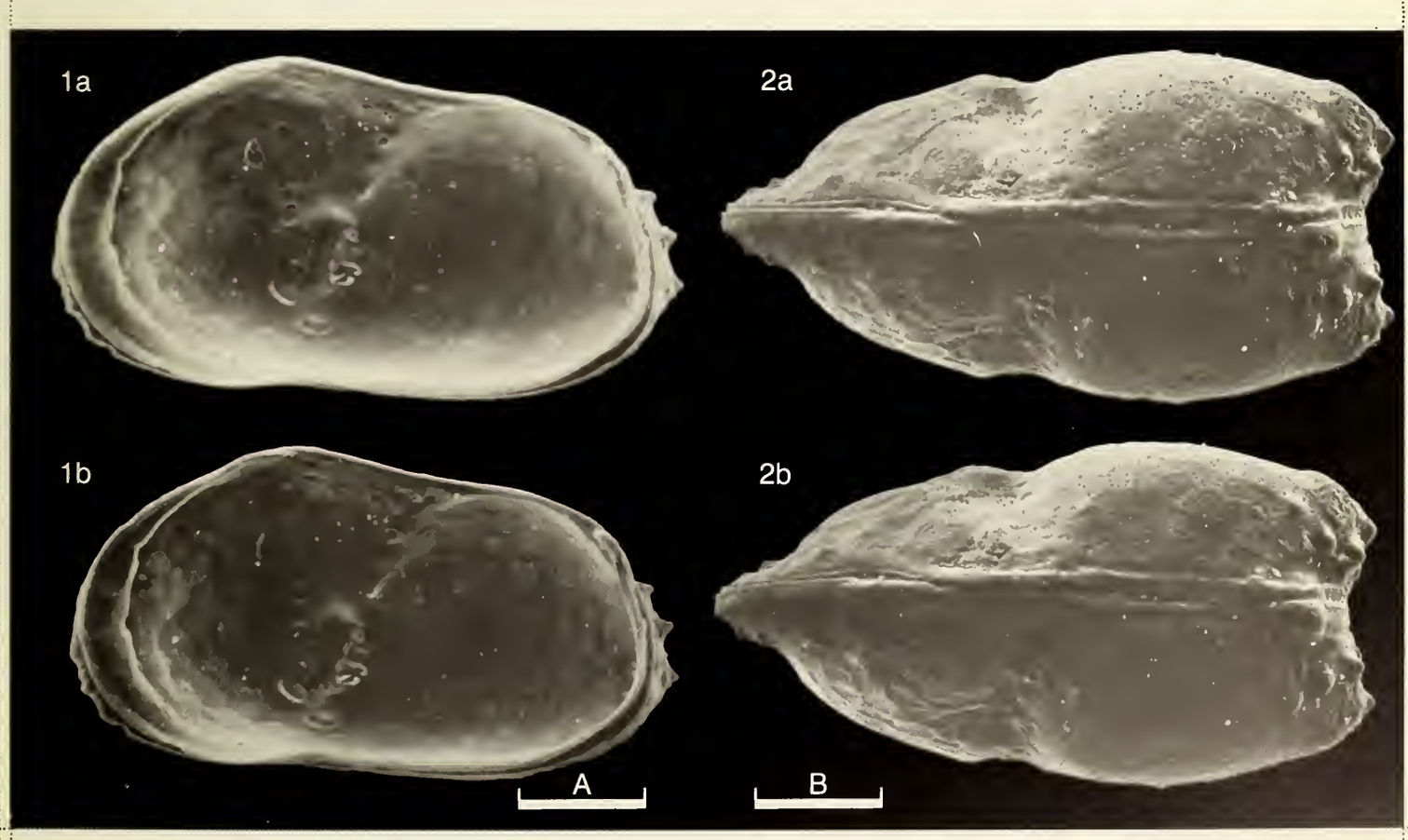
Distribution: *L.plena* has so far only been found in Pleistocene deposits in Guizhou Province, SW China.

Acknowledgement: This study was undertaken as a visiting Research Scholar at the Department of Geology, University of Hull, England.

Explanation of Plate 14, 126

Fig. 1, RV int. lat. (paratype, **103068,** 490μm long); fig. 2, car., ext. dors. (paratype, **103069,** 520μm long).
Scale A (100μm; × 188), fig. 1; scale B (100μm; × 186), fig. 2.


1a
2a
1b
2b
A


1a
2a
1b
2b
A
B

595.337.14 (119.1) (510 : 161.104.26) : 551.312.4 + 552.52

ON *LIMNOCYTHERE XINANENSIS* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Limnocythere xinanensis sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103060;** ♀ LV.
[Paratypes: three female valves and carapaces, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103061–103063**].

Type locality: Borehole CK–17 at Caohai Lake, Weining County, Guizhou Province, SW China; lat. 26° 51′N, 104° 12′E. At a depth of 17m from the surface; black shale of Pleistocene age.

Derivation of name: From its occurrence in the Xinan region of China.

Figured specimens: Nanjing Institute of Geology and Palaeontology nos. **103060** (holotype, ♀ LV: Pl. **14,** 128, fig. 1), **10361** (paratype, ♀RV: Pl. **14,** 128, fig. 2), **10362** (paratype, ♀ RV: Pl. **14,** 130, fig. 1), **103063** (paratype, ♀ car.: Pl. **14,** 130, fig. 2). All of the figured specimens are from the type locality and horizon.

Diagnosis: Shell reniform but more broadly rounded in front, dorsal side straight, ventral side curved. Median and anterior dorsal, vertical sulci occur, of which the median is the stronger. Surface ornamentation of five nodes and primary and secondary reticulation. Two nodes lie in the dorsal half of the shell on either side of the median sulcus. The other nodes lie in the ventral half of the shell, one behind the median sulcus, the other two smaller nodes lie one above the other in front of the median sulcus. Hinge merodont with terminal undivided toothplates linked by a groove in the

Explanation of Plate 14, 128

Fig. 1, ♀LV, ext. lat. (holotype, **103060,** 480μm long); fig. 2, ♀ RV, ext. lat. (paratype, **103061,** 490μm long). Scale A (100μm; × 187), figs. 1, 2.

Diagnosis: (cont.) right valve. Row of four closely pressed adductor muscle scars centrally placed on the ridge which represents the expression of the median sulcus internally, frontal scar oval on the same level as the two uppermost adductors and two rounded mandibular scars more ventrally placed. In dorsal view pointed anteriorly and somewhat arrow-shaped. Three small dorsal spines in the posterior half of the right valve.

Remarks: *L.xinanensis* is closely related to *L.stationis* Vávra, 1891 but differs clearly from the latter species as originally figured (*Archiv Naturw. Landesd. Böhmens,* **8,** 109, fig. 38, 1891) in being much more slender and more pointed posteriorly in dorsal view and in tapering more posteriorly and not being so evenly rounded anteriorly in lateral view. *L.stationis* was thought to be confined to Europe until Martens (*Hydrobiologia,* **110,** 138–141, figs. 9–16, 1984) recorded it from the Sudan and gave good illustrations, Martens' material is much nearer to the Chinese material in dorsal view but in lateral aspect does not taper so much posteriorly and the dorsal margin shows a more pronounced break in slope than does *L.xinanensis* where the dorsal margin is long and straight. Martens notes the variability of dorsal spines in *L.stationis* where up to three may be found although they were completely absent from his African specimens. *L.xinanensis* shows a similar variability in the development of these spines. *L.xinanensis* from the lower part of the present section consisted of many females and rare males neither of which carried dorsal spines. In the middle of the section specimens with one dorsal spine were found and both males and females were present, whilst in the upper part of the section many males and females occurred which had three dorsal spines.

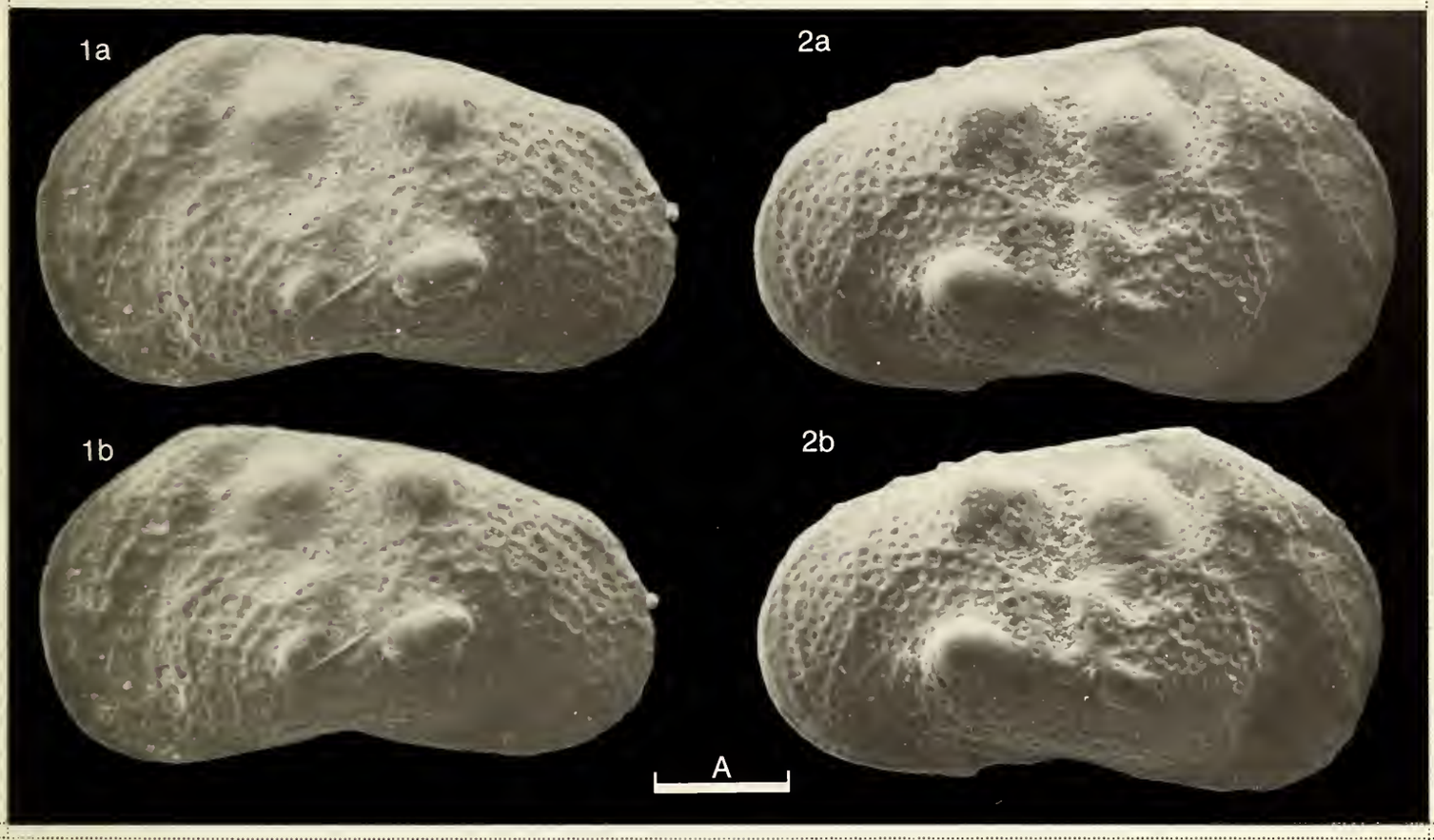
De Deckker's Australian species *L.dorsosicula* (*Proc. R. Soc. Vict.,* **93,** 43–45, figs. 1, 2a–i, 1981) has between three and six spines dorsally and also differs in its much reduced turberculation. Comparisons with other species are not close.

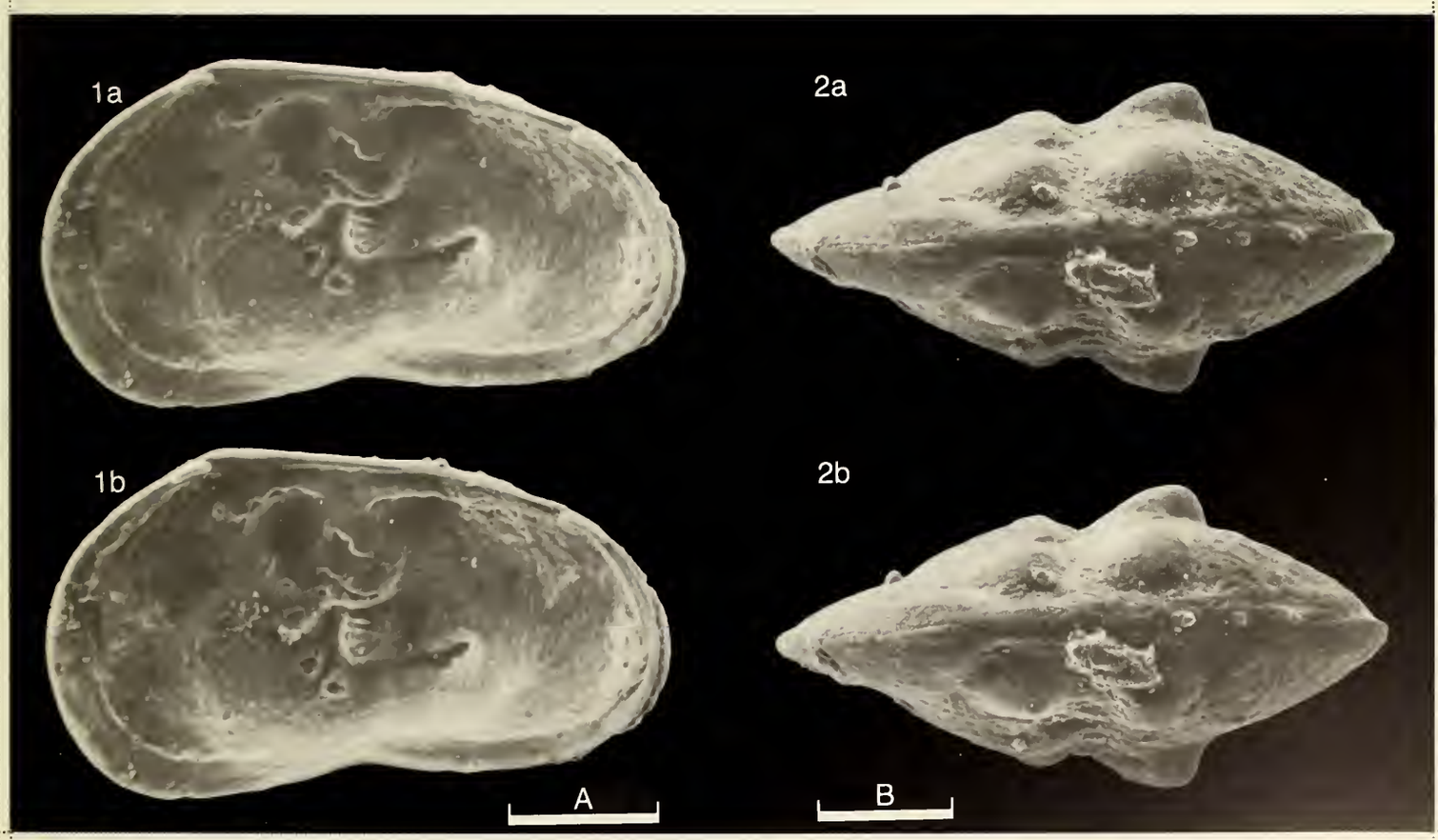
Distribution: *Limnocythere xinanensis* has been found in the Guizhou Yunnan Province in China in deposits ranging from Pleistocene to Recent in age.

Acknowledgement: This study was undertaken as a visiting Research Scholar at the Department of Geology, University of Hull, England.

Explanation of Plate 14, 130

Fig. 1, ♀ RV, int. lat. (paratype, **103062,** 440μm long); fig. 2, ♀ car. ext. dors. (paratype, **103063,** 480μm long). Scale A (100μm; × 207), fig. 1; scale B (100μm; × 183), fig. 2.


1a
2a
1b
2b
A


1a
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1b
2b
A
B

595.337.14 (119.1) (510 : 161.104.26) : 551.312.4 + 552.52

ON *METACYPRIS APHTHOSA* ZHAO sp. nov.

by Zhao Yuhong
(Academia Sinica Nanjing Institute of Geology and Palaeontology, China & University of Hull, England)

Metacypris aphthosa sp. nov.

Holotype: Academia Sinica Nanjing Institute of Geology and Palaeontology, China, coll. no. **103074(a)**; ♀ carapace.

[Paratypes: two male valves, one female carapace and one male carapace, Academia Sinica Nanjing Institute of Geology and Palaeontology, nos. **103074(b)–103074(e)**].

Type locality: Borehole at Caohai Lake, Weining County, Guizhou Province, SW China; lat. 26° 51′N, 104° 12′E. At a depth of 27m from the surface; black mudstones of Pleistocene age (Q2–3).

Derivation of name: Greek *aphthosus,* measles; in reference to the surface ornamentation.

Figured specimens: Academia Sinica Nanjing Institute of Geology and Palaeontology nos. **103074(a)** (holotype, ♀ car.; RV: Pl. **14,** 132, figs. 1, 3), **10374(b)** (paratype, ♀ car: Pl. **14,** 132, fig. 2), **103074(c)** (paratype, ♂ RV: Pl. **14,** 134, fig. 1), **103074(e)** (paratype, ♂ car: Pl. **14,** 134, fig. 2), **103074(d)** (paratype, ♂ RV: Pl. **14,** 134, fig. 1). All of the figured specimens are from the type locality and horizon.

Diagnosis: Distinct sexual dimorphism. Females medium-sized, rounded-rectangular in lateral view and cordate in dorsal view with the greatest width posteriorly. Males small, elongate in lateral view and oval in dorsal view with the greatest width at mid-length. Larger left valve overlaps right valve. Surface reticulate. Females have a very faint trace of a dorsal sulcus which is not seen in any of the males. Two to four rows of very fine pits occur marginally and are well seen along the dorsal

Explanation of Plate 14, 132

Figs. 1, 3, ♀ car., RV (holotype, **103074(a),** 480μm long): fig. 1, ext. lat., fig. 3, int. lat. Fig. 2, ♀ car. (paratype, **103074(b),** 480μm long).

Scale A (200μm; × 134), figs. 1–3.

margins of the valves in dorsal view (Pl. **14,** 132, fig. 2: Pl. **14,** 134, fig. 2). Each valve develops five tubercles anteriorly and four or five posteriorly. These are constant in position and there is no difference between the sexes. Hinge merodont, right valve with a long, smooth anterior toothplate, a shorter, thicker, smooth posterior toothplate and slightly sinuous interconnecting groove. Right valve free margin with strong selvage and posteroventrally the valve bulges down well below the valve margin. Typical cytheracean muscle scar pattern with a row of four adductor scars, the outer two oval, the central two very elongated. Two small, rounded mandibular scars occur anteroventrally.

Remarks: This species is very similar to *Metacypris changzhouensis* Chen (*Acta Palaeon. Sinica,* **13**(1), 7, pl. 2, figs. 9, 13, 1965) but in the latter the tubercles lack the constancy and regular distribution seen in *M.aphthosa. M.changzhouensis* differs further in that the right valve is larger than the left valve, and in addition it is also a bigger species (length 680μm). Differences are also apparent in dorsal view when the posterior part of the carapace is compared. It also differs from *Metacypris unibulla* Hou & Chen (*Acta Palaeon. Sinica,* **13**(1), p. 9, pl. 1, figs. 5, 9 1965) because the latter only has one posterior tubercle, is thinner in dorsal view and differs in size amongst other things. The present species differs from *Metacypris cordata* Brady & Roberston (Brady and Roberston, *Ann. Mag. nat. Hist.*, Ser. **4. 6,** 19–20, pl. VI, figs. 1, 9, 1870; Pinto & Sanguinetti, *Esc. Geol. P. Alegre,* **4,** pl. II, figs. 1 a–e, 1962; Colin & Danielopol, *Palaebiologie Continetale,* **XI, 1,** 29–30, pl. 14, figs. 5–9, 1980), in that in the latter the right valve is the larger, there is no surface tuberculation and it is longer and narrower than *Metacypris aphthosa* which is a short and very inflated species.

Males, females and younger instars are all found together in the deposits examined although the females are more than twice as abundant as the males and instars together.

Distribution: *M.aphthosa* has so far only been found in Pleistocene deposits in Guizhou Province, SW China.

Acknowledgement: This study was undertaken as a visiting Research Scholar at the Department of Geology, University of Hull, England.

Explanation of Plate 14, 134

Fig. 1, ♂ RV, ext. lat. (paratype, **103074(c),** 440μ long); fig. 2, ♂ car., dors (paratype, **103074(e),** 400μm long); fig. 3, ♂ RV, int. lat. (paratype, **103074(d),** 420μm long).

Scale A (200μm; × 146), figs. 1–3.


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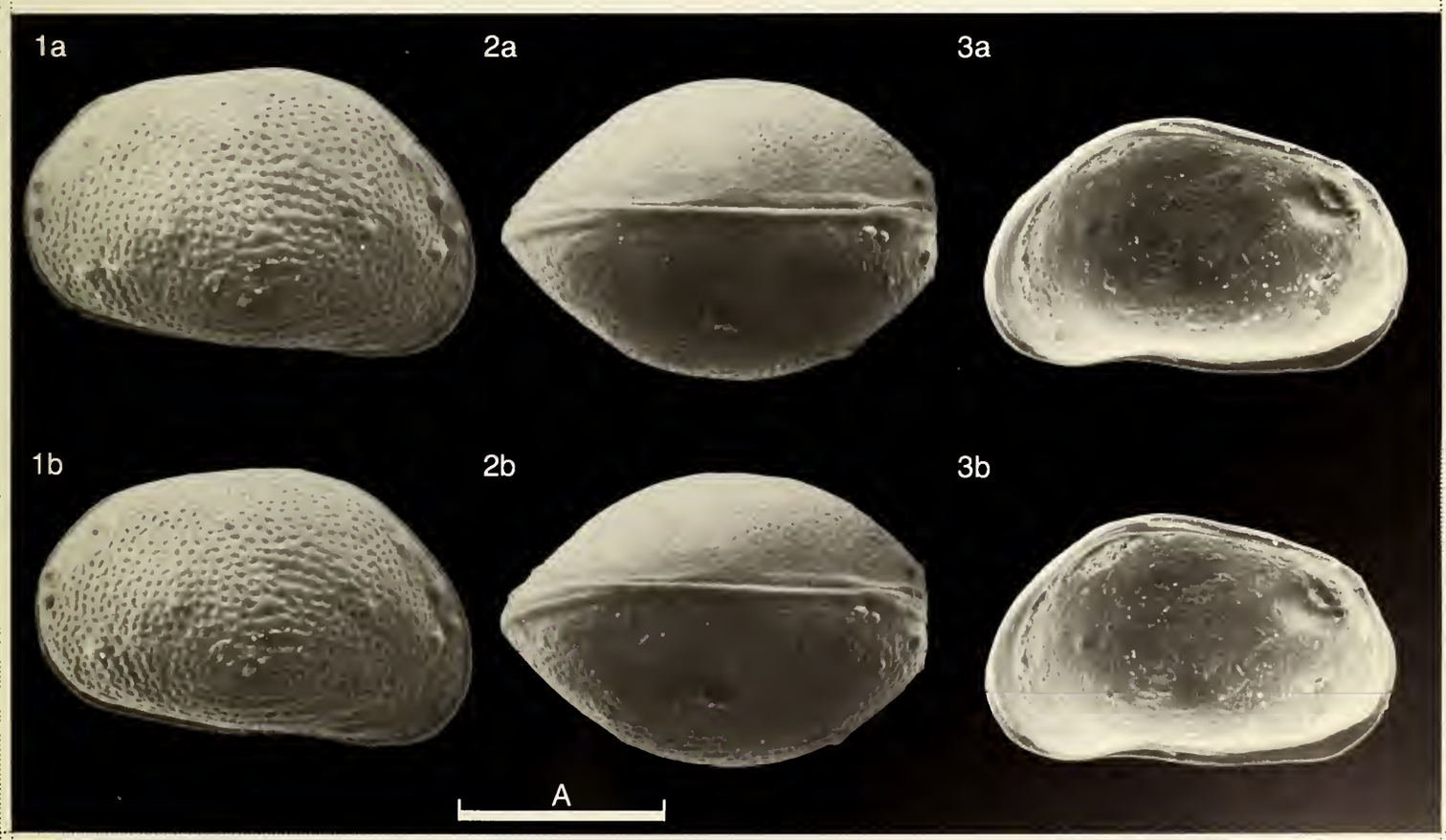
3a
1b
2b
3b
A


1a
2a
3a
1b
2b
3b
A

595.337.14 (116.333) (669 : 161.001.06) : 551.35

ON *BENINEA IBECETENENSIS* APOSTOLESCU gen. et sp. nov.

by Vespasian Apostolescu
(5, rue J. –C. Bézanier, 78360–Montesson, France)

Genus *BENINEA* gen. nov.

Type-species: *Beninea ibecetenensis* sp. nov.

Derivation of name: from Benin, W Africa.

Diagnosis: Cytheridae essentially characterized by its hinge. Right valve: anterior element consisting of a strong, rounded tooth, a long crenulate groove and a posterior plate-like cardinal element bearing five strong crenulations; left valve: large anterior socket, long crenulate ridge slightly arched and a posterior strongly crenulate socket. No accommodation groove.

Carapace subovoid in side view, elongate ovate dorsally. Anterior margin broadly rounded, posterior margin obliquely rounded. Left valve larger than right; dorsal margin regularly arched, with greatest height in middle part. Anterior margin of right valve more angular. Surface smooth with well developed normal sieve-type pore-canals. Eye tubercle absent. Sexual dimorphism pronounced; males more elongate than females.

Central muscle scars: vertical row of four coalescent rounded scars and two equally rounded scars in front (Text-fig. 1).

Narrow marginal zone; line of concrescence coincides with the inner margin. Radial pores straight, simple and up to eight on anterior margin (Text-fig. 1).

Remarks: Externally, *Beninea* is comparable to *Bopaina* Apostolescu, 1961 and *"Clithrocytheridea" senegali* Apostolescu, 1961 from the Senonian of Senegal (*Rev. Inst. franç Pétrole,* **16,** (7–8), 779–867). Except for the absence of an accommodation groove and the median ridge on the left valve, the hinge of *Beninea* is close to *Apatocythere* Triebel, 1940 (*Senckenbergiana,* **22,** (3/4), 160–227),

Explanation of Plate 14, 136

Fig. 1, ♂ car., rt. lat. (paratype, **P–351,** 560μm long); fig. 2, ♀ car., rt. lat. (holotype, **H–350,** 510μm long); fig. 3, ♀ car., lt. lat. (holotype, **H–350,** 510μm long).

Scale A (200μm; × 110), fig. 1; scale B (200μm; × 120), fig. 2; scale C (200μm; × 130), fig. 3.

Remarks: (cont.) *Dordoniella* Apostolescu, 1955 (*Cah. géol.,* **33,** 329–330), and *Schulapacythere* Malz, 1970 (*Senckenbergiana,* **51,** (5/6), 401–409). In external view, *Beninea* differs from these genera by the shape of the carapace and the absence of an eye tubercle.

Beninea ibecetenensis sp. nov.

Holotype: V. Apostolescu Collection, Lab. Micropaleontol., Mus. natl. Hist. nat., Paris, France, no. **H–350;** ♀ carapace.

[*Paratypes:* 12 carapaces and valves; same repository as holotype].

Type locality: Ibeceten borehole (at 181–182m), near the town of Anthieme, Nigeria, Benin, W Africa (see Apostlescu, 1961, *Rev. Inst. franç Pétrole,* **16** (7–8), tab. 3, 786); early Senonian, Cretaceous.

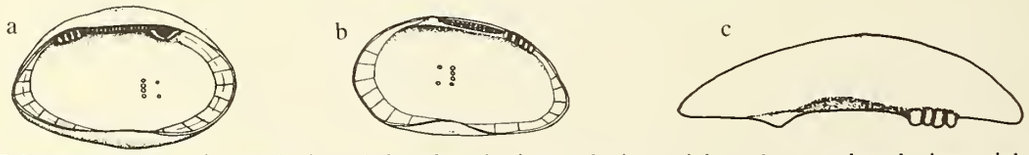
Derivation of name: From the bore-hole Ibeceten, the type locality.

Figured specimens: Mus. natl. Hist. nat. Paris, France, V. Apostolescu Collection, no. **H–350** (holotype, ♀ car.: Pl. **14,** 136, figs. 2, 3), **P–351** (paratype, ♂ car.: Pl. **14,** 136, fig. 1; Pl. **14,** 138, fig. 1), **P–352** (paratype, ♀ LV: Pl. **14,** 138, fig. 2), **P–353** (paratype, ♀ RV: Pl. **14,** 138, fig. 3). All from the type-locality, Ibeceten borehole (at 181–182m), Benin, W Africa. Early Senonian, occurring together with other ostracodes such as *Cophinia apiformis* (Reyment, 1960).

Diagnosis: As for the genus.

Distribution: Early Senonian, Cretaceous, of the Benin-Togo basin, W Africa.

Acknowledgment: Dr. J. P. Colin, Esso Production Research–European Lab. (Bégles) is thanked for providing the S.E.M. micrographs (taken by C. Lété) and for reading the text.

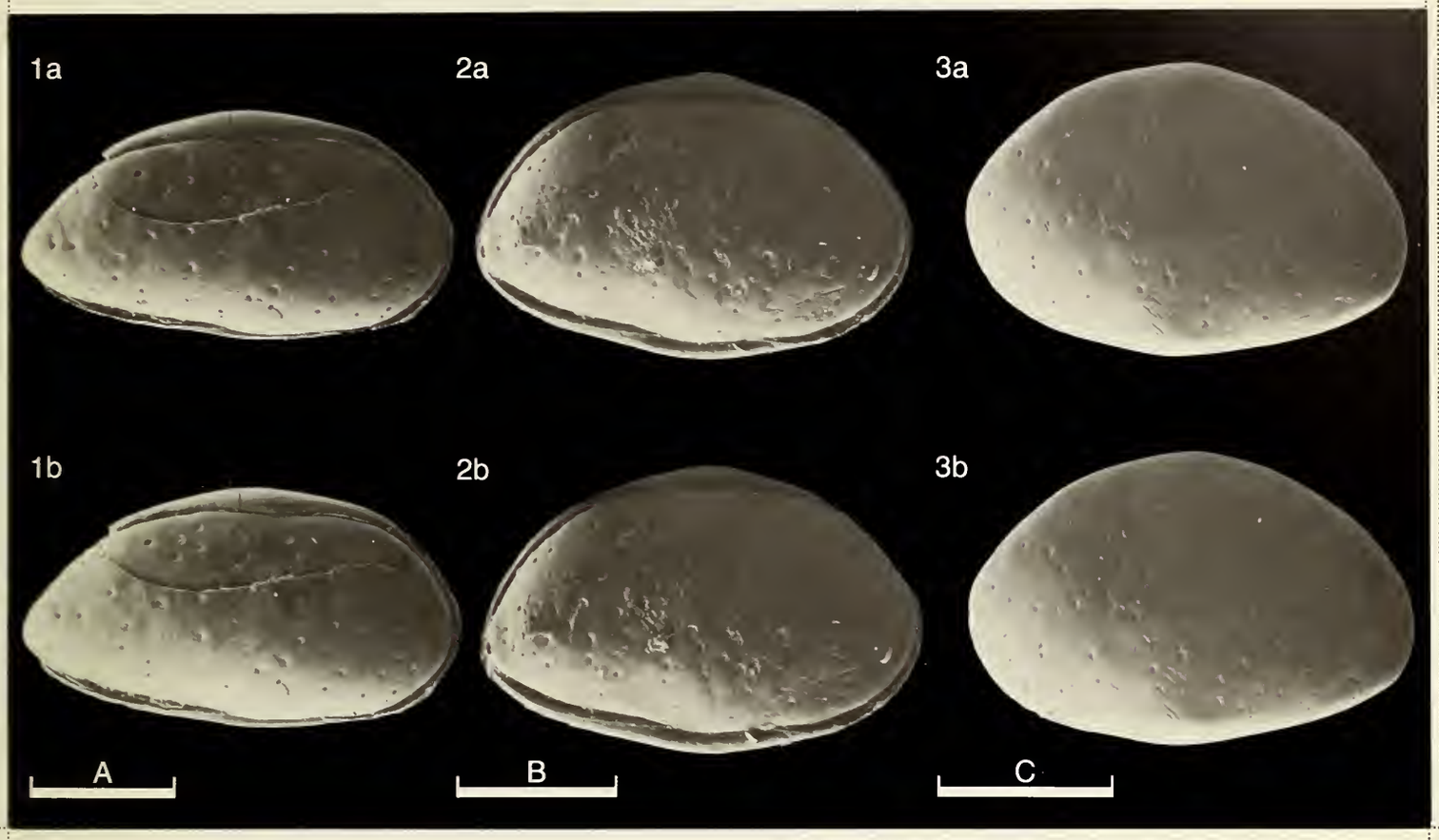


Text-fig. 1. *B.ibecetenensis:* a, internal view, left valve; b, internal view, right valve; c, dorsal view, right valve.

Explanation of Plate 14, 138

Fig. 1, ♂ car., ext. dors. (paratype, **P–351,** 560μm long); fig. 2, ♀ RV, int. lat. (paratype, **P–352,** 480μm long); fig. 3, ♀ LV, int. lat. (paratype, **P–353,** 490μm long).

Scale A (200μm; × 110), fig. 1; scale B (200μm; × 120), fig. 2; scale C (200μm; × 130), fig. 3.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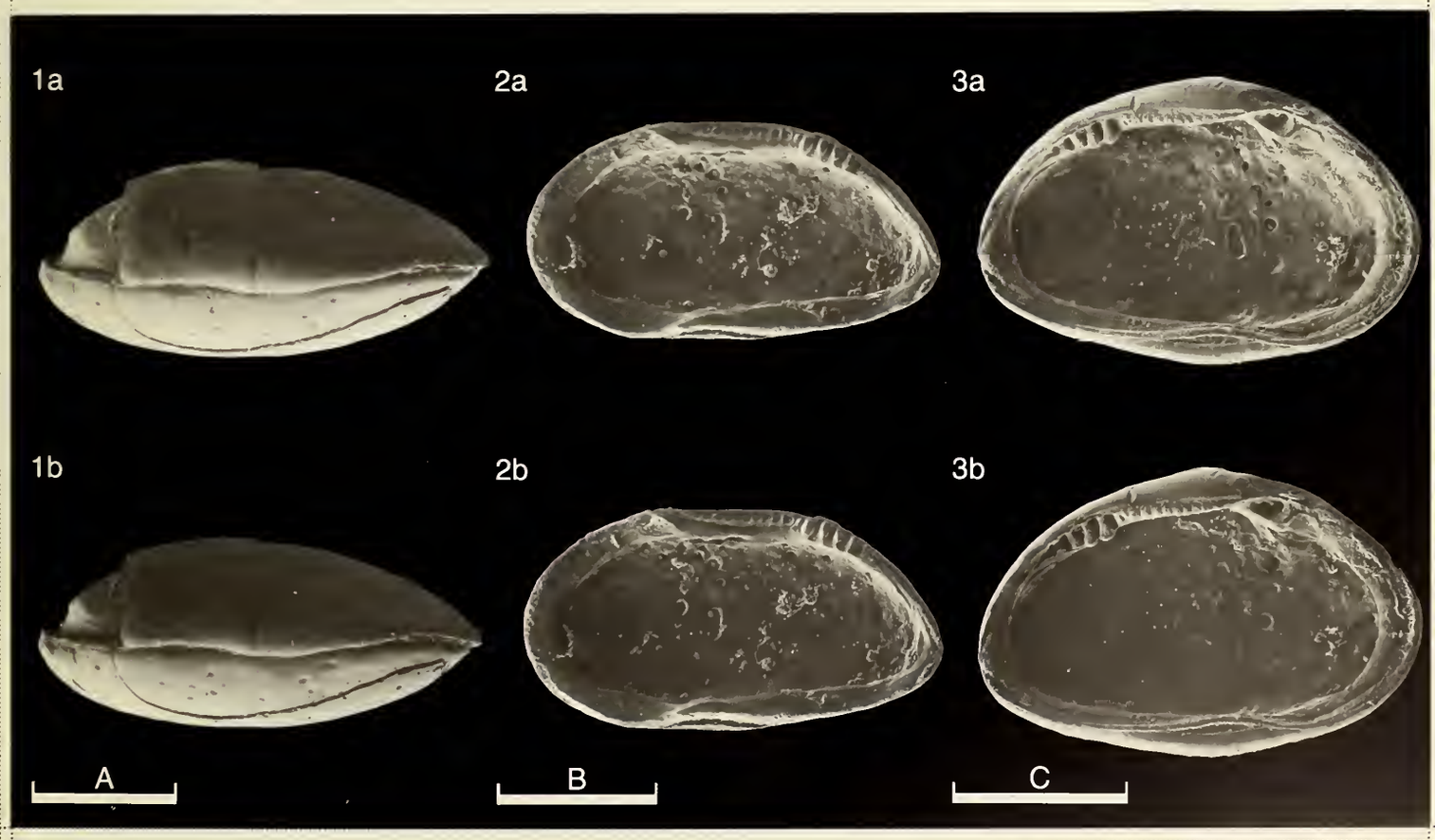
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Stereo-Atlas of Ostracod Shells 14 (32) 139-142 (**1987**)
595.337.3 (113.51) (420 : 162.003.55 + 411 : 162.004.56) : 551.351

ON *GLYPTOLICHVINELLA SPIRALIS* (JONES & KIRKBY)

by Robert F. Lundin
(Arizona State University, Tempe, U.S.A.)

Genus *GLYPTOLICHVINELLA* Pozner, 1966

Type-species (by original designation): *Kirkbya spiralis* Jones & Kirkby, 1884

Diagnosis: Cytherellacean genus the lateral surfaces of which are ornamented with two ridges, one which is subparallel to the lateral outline and may or may not continue to form a marginal ridge, and another which is median and bends below the adductorial sulcus. Straguloid process variably developed. Domatium with variable number of separate egg compartments.

Remarks: The earliest valid publication of this genus known to me is that of K. Ya. Gurevich (in *Fossil Ostracoda,* O. S. Vyalov, ed., *Acad. Sci. Ukr. SSR, Inst. Geol. & Geochem. Fossil Fuels, 1966 = Israel Program for Scientific Translations,* 1971 English translation of Russian original). In that publication, Pozner is credited with authorship of the genus and the generic name is spelled *Glyptolichvinella* rather than *Glyptolichwinella* as it appears in various other literature. Accordingly, the former spelling is used here.

Lichvinella scopinensis Pozner (*op. cit.*) is the type-species for *Lichvinella.* M. N. Gramm (Vladivostok) has provided me with two photographs of *L.scopinensis,* one of which shows that the females of that species have egg compartments and a limen. The discovery of egg compartments in *Glyptolichvinella* indicates, therefore, that this genus differs from *Lichvinella* only by the presence of a separate longitudinal ridge on the lateral surface of each valve. I judge this to be only a species-level difference but do not formally synonymize the two genera until more and better material of each can be studied.

Explanation of Plate 14, 140

Fig. 1, ♂ car., ext. lt. lat (**BMNH I 1719,** [*pars*], 1030μm long); fig. 2, ♀ car., ext. rt. lat., light photograph to show egg compartments (**BMNH I 1719,** [*pars*], 880μm long); fig. 3. ♀ car., ext. lt. lat. (**BMNH OS 7384,** 1240μm long).
Scale A (200μm; × 75), fig. 1; scale B (200μm; × 84), fig. 2; scale C (200μm; × 61), fig. 3.

1884 *Kirkbya spiralis* sp. nov.; T. R. Jones & J. W. Kirkby, *Berwickshire Nat. Club, Hist.,* **10,** (1882–1884), 323, pl. 2, figs. 12, 13.
1885 *Kirkbya spiralis,* Jones & Kirkby; T. R. Jones & J. W. Kirkby, *Ann. Mag. nat. Hist.,* ser. 5, **15,** 184, pl. 3, fig. 11.
1978 *Glyptolichvinella spiralis* (Jones & Kirkby, 1884); E. Robinson, *in* Bate, R. H. & Robinson, J. E. (eds.), A Stratigraphical Index of British Ostracoda, *Geol. J. Spec. Issue,* **8,** 138, pl. 5, fig. 4, table 2.

Type specimens: Apparently are lost. British Museum (Nat. Hist.) **I 2554,** identified (slide information) as primary types of *Kirkbya spiralis* Jones & Kirkby and "*Leperditia subrecta,* Portlock", consist of two rock chips with many leperditiid specimens but none of *Kirkbya spiralis.* Under present knowledge of the species, it is premature to designate a neotype.

Type locality: Lower Carboniferous (Dinantian) limestone on the coast near Randerstone, Fifeshire, Scotland.

Figured specimens: British Museum (Nat. Hist.), **OS 7384** (♀ car.: Pl. **14,** 140, fig. 3), **I 1719** (*pars*) (♂ car.: Pl. **14,** 140, fig. 1), **I 1719** (*pars*) (♀ car.: Pl. **14,** 140, fig. 2; Pl. **14,** 142, figs. 1, 2). **OS 7384** is from Megg's Linn (Lower Asbian, Dinantian), Lewisburn, North Tyne, Northumberland, England; approx. lat. 55° 10′N, long. 2° 20′W. Specimens **I 1719** are from Lower Carboniferous (Dinantian) "Calcareous Sandstone Series, at Linnhouse Water, Linlithgowshire", Scotland; approx. lat. 56° N, long. 3° 40′ W. **I 1719** contains six carapaces (two figured herein).

Diagnosis: *Glyptolichvinella* species with spiral ridge along entire margin which at midlength of dorsum runs anteroventrally and then parallels anterior, ventral, posterior and posterodorsal margins, terminating just behind the adductorial sulcus. Separate longitudinal ridge on lateral surface bends below adductorial sulcus. Anterior straguloid process weak. Adult females with five (perhaps more or less) oval to circular egg compartments in each valve. Surface granulose.

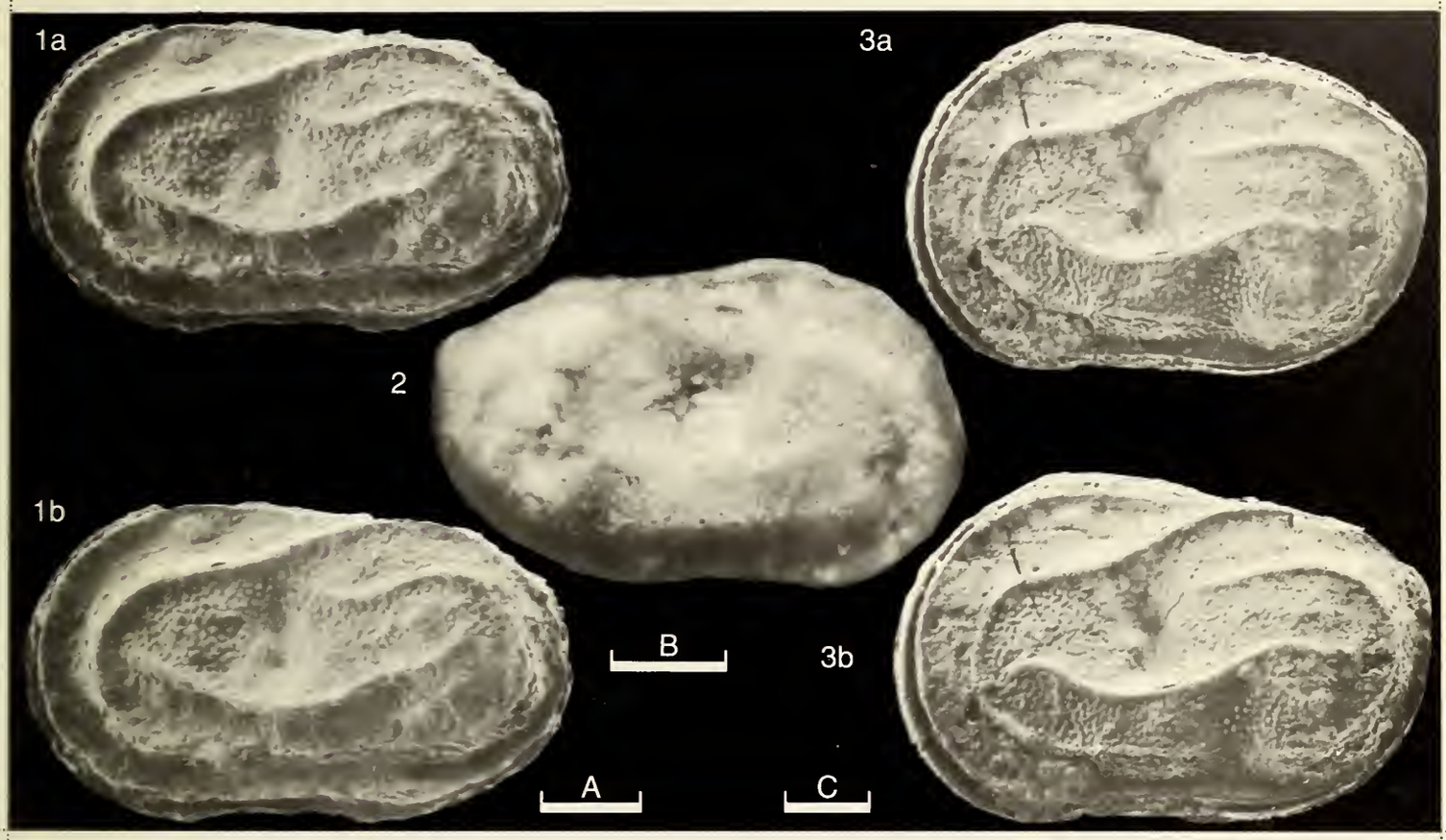
Remarks: Along with the report of Lundin & Visintainer (*Stereo-Atlas Ostracod Shells,* **14** (33), 143–148, 1987) on *G. ovicella,* this is the first report of egg compartments in the domatium of females of this genus. Only 7 specimens (carapaces) of *G. spiralis* have been available to me. All are damaged and the 3 illustrated here provide impressions of the species only in the lateral views shown.

Distribution: Known from Lower Carboniferous (Viséan) of Scotland and England (see Robinson, 1978, *op. cit.*) Reported also from the Lower Carboniferous of the USSR (see Gurevich, 1966, *op. cit.*).

Acknowledgement: Support from College Liberal Arts and Sciences, Arizona State Univ. is gratefully acknowledged.

Explanation of Plate 14, 142

Fig. 1, 2, ♀ car. (**BMNH I 1719,** [*pars*], 800μm long); fig. 1, ext. rt. lat.; fig. 2 ext. rt. lat. (median and mid-anterior areas).
Scale A (200μm; × 88), fig. 1; scale B (50μm; × 164), fig. 2.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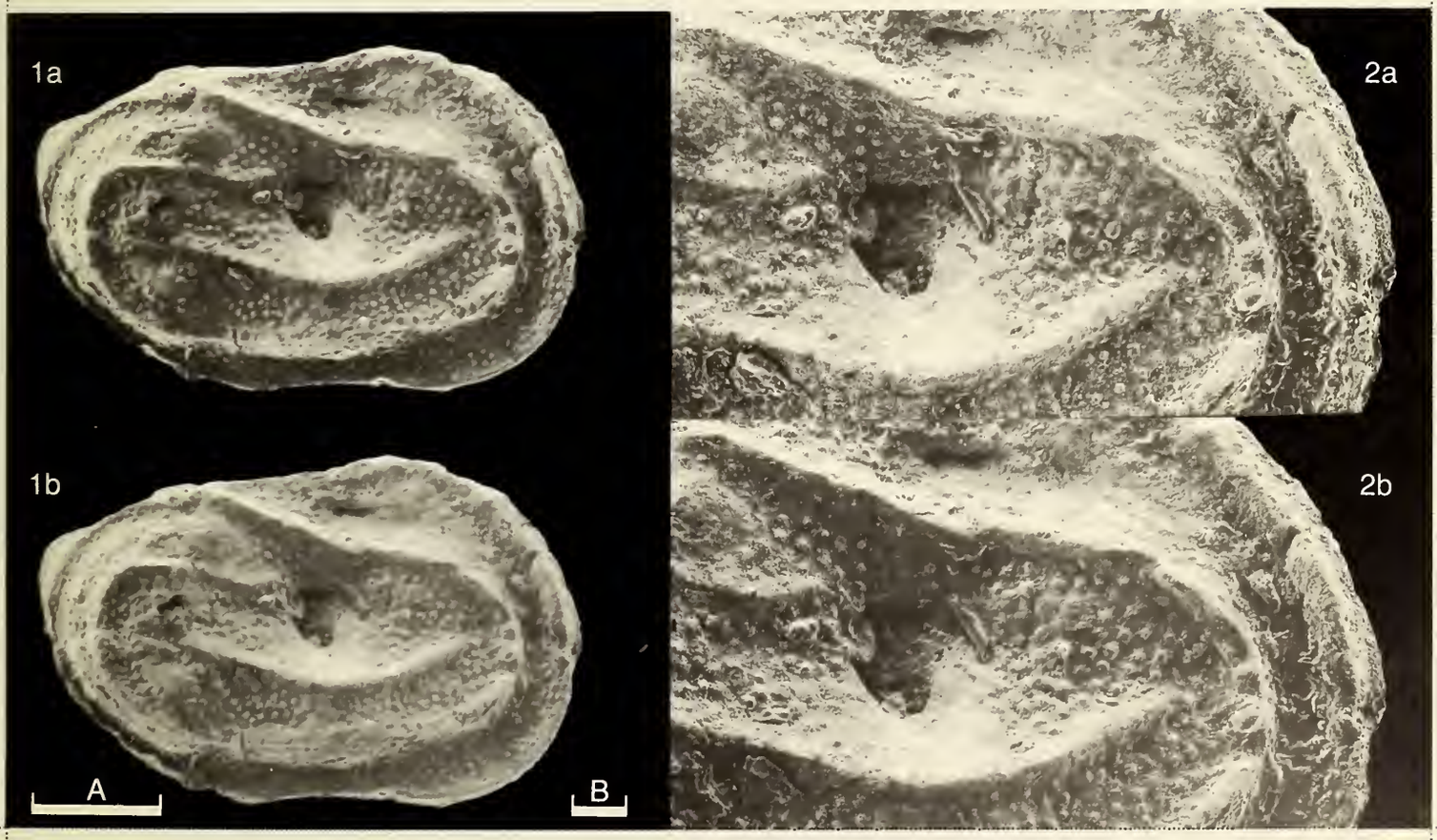
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ON *GLYPTOLICHVINELLA OVICELLA LUNDIN & VISINTAINER sp. nov.*

by Robert F. Lundin & Linda M. Visintainer
(Arizona State University, Tempe, U.S.A.)

Glyptolichvinella ovicella sp. nov.

Holotype: Department of Geology, Arizona State University (ASU), no. **ASU X–91;** ♀ car.

Type locality: White Hill no. 1 borehole, Canning Basin, Western Australia; latitude 21° 9′ 20.35″S, longitude 127° 35′ 14.98″E. Holotype from interval 1520–30m below top of borehole in rocks of probable Famennian age, Devonian. Other figured and studied specimens from samples ranging from 1080–2890m below top of borehole.

Derivation of name: Latin *ovum,* egg, and *cella,* chamber; referring to the presence of egg compartments.

Diagnosis: *Glyptolichvinella* species with one ridge paralleling the margin and a longitudinal ridge approximately at midheight which bends below S_2. Females with distinct domatium having three to six separate egg compartments in each valve.

Figured specimens: Department of Geology, Arizona State University (**ASU**), nos. **X–91** (holotype, ♀ car.: Pl. **14,** 144, fig. 1; Pl. **14,** 146, fig. 7), **X–97** (♀ car.: Pl. **14,** 144, fig. 2), **X–93** (♀car.: Pl. **14,** 144, fig. 3), **X–92** (tecnomorphic car.: Pl. **14,** 146, figs. 1, 2), **X–100** (♀ car.: Pl. **14,** 146, fig. 3), **X–94** (♀ car.: Pl. **14,** 146, fig. 6), **X–99** (♀ car.: Pl. **14,** 146, fig. 5), **X–98** (♀ car.: Pl. **14,** 146, fig. 4). All specimens from the type locality but from various stratigraphic levels (see *Type locality*).

Explanation of Plate 14, 144

Fig. 1, ♀ car., ext. lt. lat. (holotype, **ASU X–91,** 600μm long); fig. 2, ♀ car., ext. lt. lat. (**ASU X–97,** 730μm long); fig. 3, ♀ car., ext. rt. lat. (**ASU X–93,** 660μm long).

Scale A (200μm; × 86), fig. 1; scale B (200μm; × 76), fig. 2; scale C (200μm; × 84), fig. 3.

Remarks: *Glyptolichvinella ovicella* is readily distinguished from *G. spiralis* (= *Kirkbya spiralis* Jones & Kirkby, 1884; see Jones & Kirkby, *Ann. Mag. nat. Hist.,* 5, **15,** 184, 1885) by differences in the lateral ridges, and from *G. nodosovidera* Crasquin, 1983 (see Crasquin, *Ann Soc. Géol. Nord.* **CII,** 191–204, 1983) by differences in the lateral ridges and by the absence of eye tubercles.

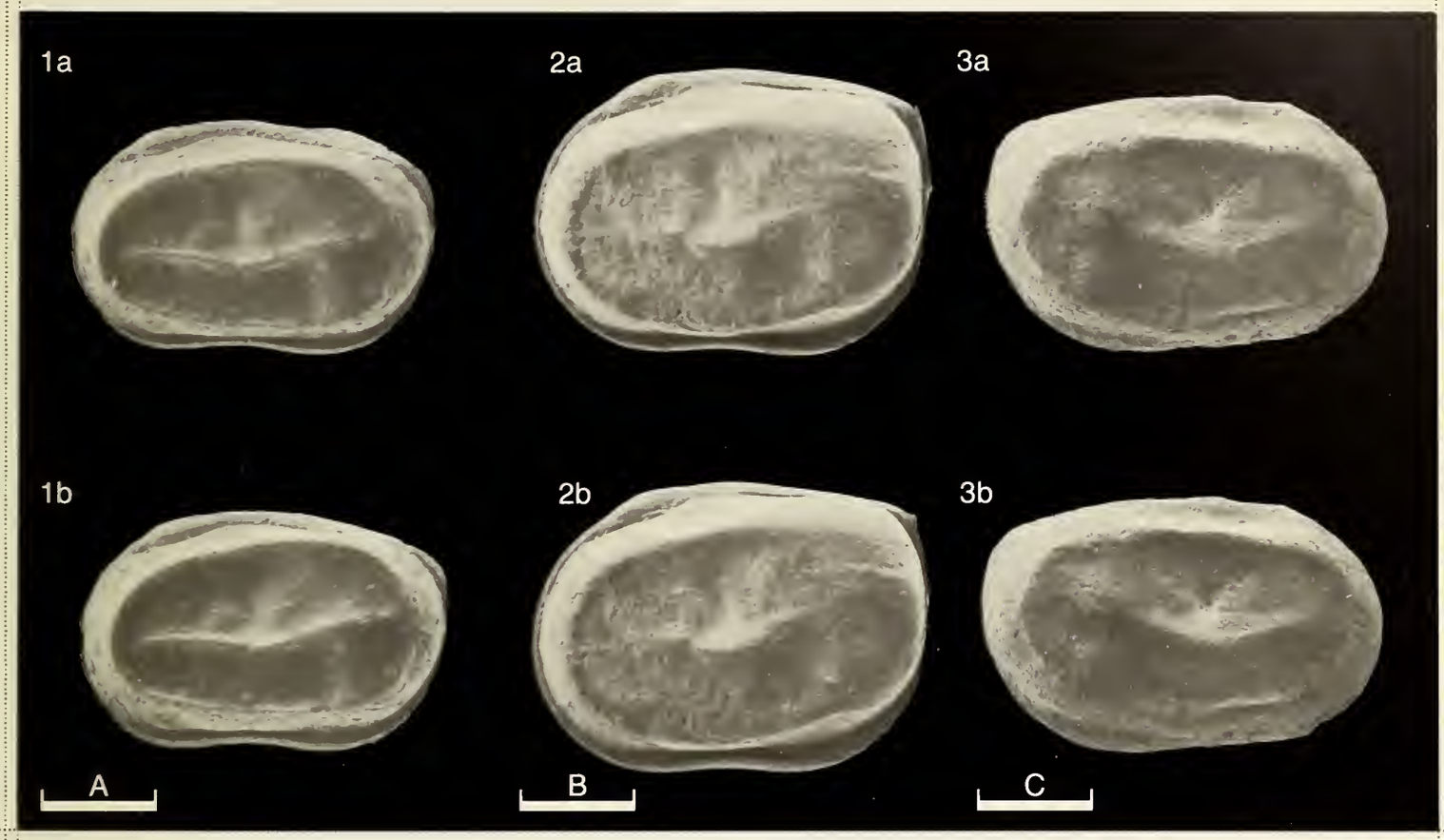
This is the first report of separate compartments to house eggs for this genus. Lundin (see *Stereo-Atlas of Ostracod Shells,* **14** (32), 139–142, **1987**) reports similar egg compartments in the type-species, *G. spiralis* (Jones & Kirkby, 1884) and we conclude, therefore, that this is a generic character which needs to be verified in other species of the genus. The number of egg compartments per valve varies from three to six and no carapace studied has more than eleven or fewer than six. Normally the number of egg compartments in each valve of a carapace is equal, but in some cases the right valve has one more compartment than the left valve. There is no systematic change in the number of egg compartments per specimen through the 1810m-interval from which the studied specimens were derived.

Except for one adult tecnomorphic left valve and one juvenile tecnomorphic right valve, all specimens studied are complete carapaces. We cannot, therefore, definitively demonstrate the existence of a limen in the females. An exterior depression at the anteroventral edge of the domatium suggests a limen is present. The presence of a well-developed anterior straguloid process and the morphology of the contact margin and hinge of the two isolated valves available for study further indicate that *Glyptolichvinella* is a typical platycope ostracode.

Explanation of Plate 14, 146

Fig. 1, tecnomorphic car. ext. rt. lat. (**ASU X–92,** 580μm long); fig. 2, tecnomorphic car., ext. dors. (**ASU X–92,** 580μm long); fig. 3, ♀ car., ext. lt. lat. (**ASU X–100,** 640μm long); fig. 4, ♀ car., ext. lt. lat. (**ASU X–98,** 640μm long); fig. 5, ♀ car., ext. rt. lat. (**ASU X–99,** 660μm long); fig. 6, ♀ car., ext. dors. (**ASU X–94,** 850μm long); fig. 7, ♀ car., ext. vent. (holotype, **ASU X–91,** 600μm long).

Scale A (200μm; × 96), figs. 1, 2; scale B (200μm; × 81), fig. 3; scale C (200μm × 87), fig. 4; scale D (200μm; × 86), fig. 5; scale E (200μm; × 64), fig. 6; scale F (200μm; × 91), fig. 7.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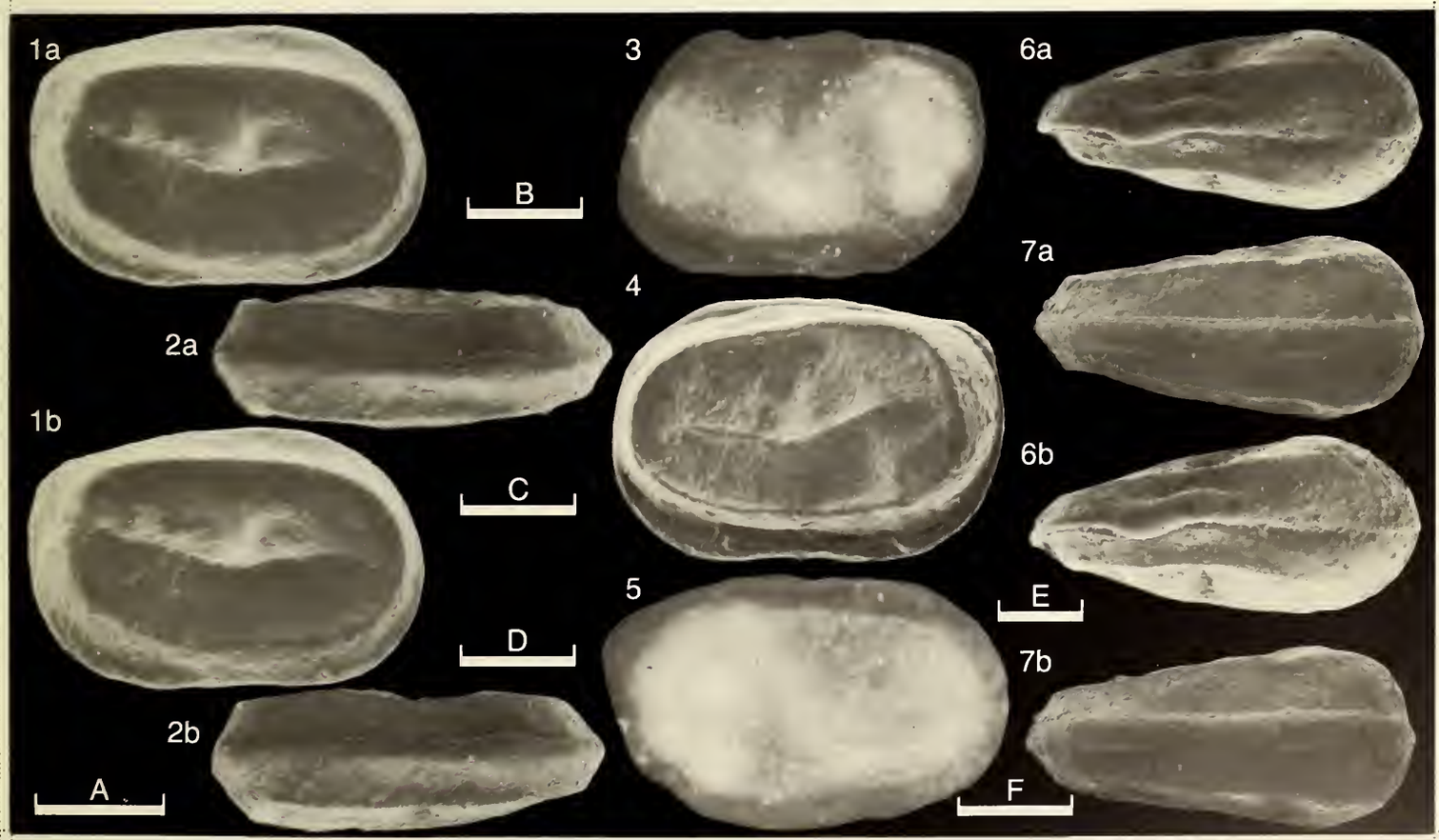
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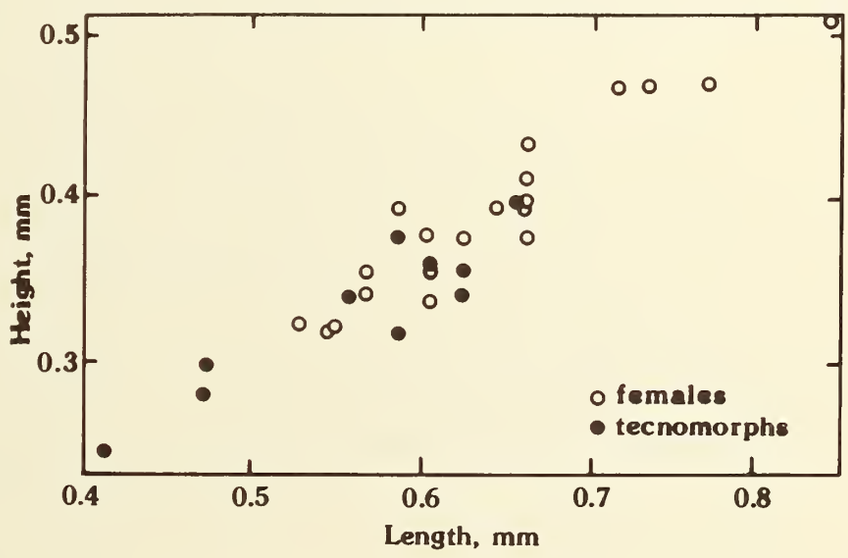
Distribution: Known only from the type locality. The stratigraphic interval containing this species is certainly, in part (if not entirely), late Devonian (Frasnian and/or Famennian) but it possibly ranges into the early Carboniferous.

Acknowledgments: We gratefully acknowledge the help of Lee B. Gibson, David Ford, Mobil Exploration & Producing Services, Inc. and the support of the College of Liberal Arts and Sciences, Arizona State University.

a b

Text-fig. 1 Drawings to show ornamentation and position of egg compartments in *G.ovicella*: a, specimen **ASU X–100** (Pl. 14, **146,** fig. 3); b, specimen **ASU X–99** (Pl. 14, **146,** fig. 5).



Text-fig. 2 Size dispersion diagram of thirty specimens of *G.ovicella* from nine stratigraphic intervals in White Hill no. 1 borehole, Western Australia.

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Index; Geographical Location

See **1** (2) 5–22 (**1973**) for explanation of the Schedules in the Universal Decimal Classification

Stereo-Atlas of Ostracod Shells: Vol. 14, Part 2

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